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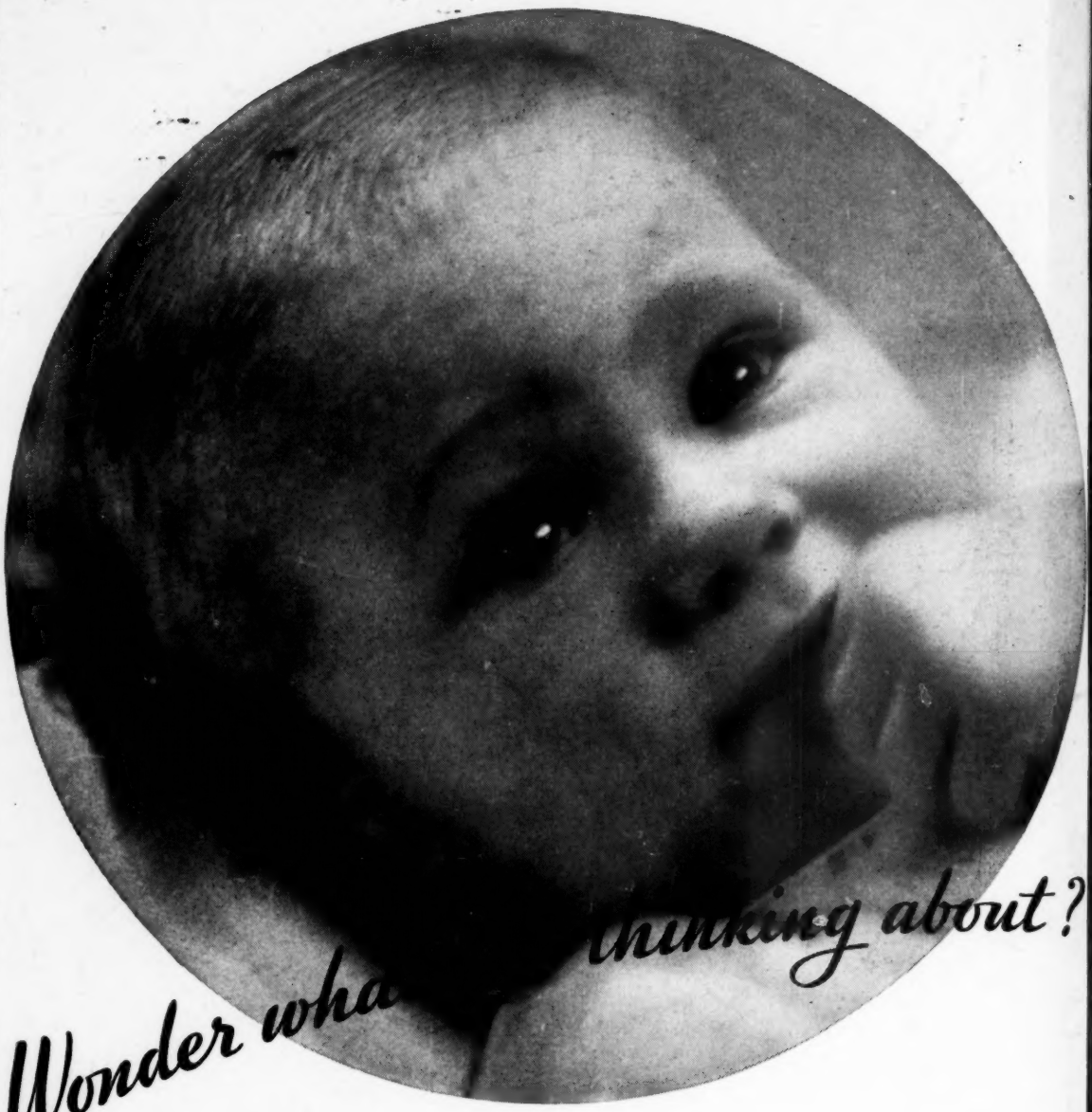

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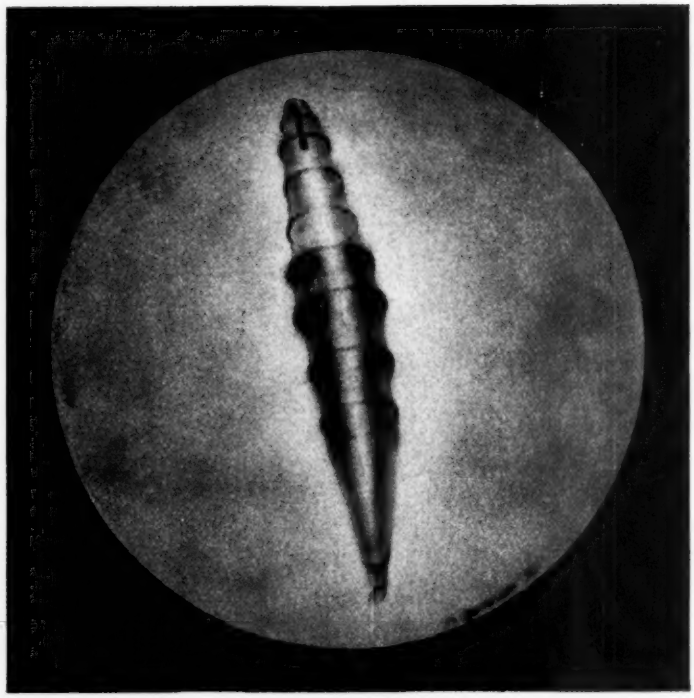

FIG. 1 (ANDERSON). OPHTHALMOMYIASIS INTERNA POSTERIOR.

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OPHTHALMOMYIASIS

A Review of the Literature and a Report of a Case of Ophthalmomyiasis Interna Posterior

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The author reports a case of ophthalmomyiasis interna posterior, unique in that of a total of eighteen reported cases it is the second case occurring on this continent, the second in an adult, and the first report of a case in which the larva died and remained in the posterior segment without impairment of the host's vision. From the Department of Ophthalmology, Duke University Medical School. Read before the American Academy of Ophthalmology and Otolaryngology, in Chicago, September 14, 1934.

That the human body is occasionally infested with maggots is well known. Although more than one hundred cases have been reported in which these larvae have been found in the conjunctival cul-de-sac, cases in which the larvae have been found in the interior of the eye are of great rarity. In 1920, Behr reviewing these cases, elaborated Hope's original terminology and proposed the term Ophthalmomyiasis externa to designate those cases in which larvae were found within the orbit but external to the globe, and the term Ophthalmomyiasis interna anterior and Ophthalmomyiasis interna posterior for those cases in which the larva was located in the anterior chamber and the posterior segment, respectively. It has been my good fortune to have had under observation a case of this latter type, incorporated below in a general review of this subject.

T. C. McC., white, male, an insurance broker, aged 46 years, complained of paroxysms of excruciating pain in the left eye. His past history was irrelevant. On July 17, 1933, an unusually warm, sultry, and sunny day, lolling half asleep in an open car while being driven through Piedmont, North Carolina, the patient was aroused by a light fluttering blow in the left eye, thought at that time to be ash from a cigar which he held. There was momentary discomfort, followed by the annoying presence of a dark crescentic-shaped object, 4 mm. long and 1 mm. wide, lying in the visual axis, and apparently hanging in space a few inches in front of the eye. This could not be dislodged by passing the hand in front of the eye, but spontaneously disappeared after a few hours, and the incident was forgotten until recalled by subsequent events. On the evening of the eighteenth, while bathing, the left eye began to sting, a sensation at first attributed to having got soap in the eye. Two hours later there was a paroxysm of severe pain. On the nineteenth, a competent ophthalmologist diagnosed the condition as conjunctivitis. The pain became so severe during the night that morphine was required. On the twentieth, the patient was first seen in the Duke University Clinic. At this time there was no great discomfort, although the effects of the previous night's experience were quite apparent. Exhaustive examinations with both slitlamp and ophthalmoscope were, with the exception of a slight generalized conjunctival injection, entirely negative. On the night of the twentieth, morphine was again employed in an effort to give relief from renewed and more violent paroxysms of pain. On the morning of the twenty-first, the patient appeared at the clinic in shock; his pulse was weak he was nauseated and vomiting, holding the left side of the face with both hands, apparently in

most abject misery, complaining that hundreds of red-hot needles were being jabbed into his left eye. Examination revealed a generalized moderate injection of the conjunctiva, and a slightly irregularly dilated pupil. The slitlamp

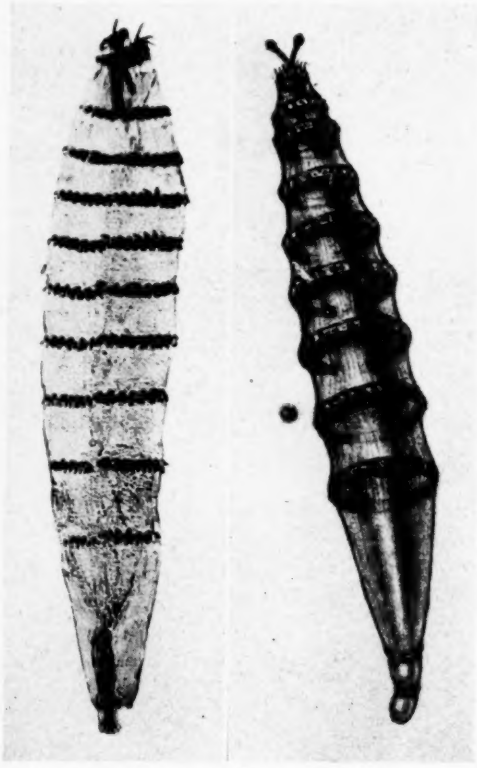

Fig. 2A Fig. 2B

Fig. 2A. Larva of Gastrophilus intestinalis (courtesy of Mr. F. C. Bishopp, Chief Entomologist of the U. S. Dept. of Agriculture).

Fig. 2B (Anderson). Schematic free-hand drawing of larva found in the vitreous, July 24, 1933.

showed the iris as somewhat fuzzy, the aqueous ray slightly opaque; the vitreous was slightly turbid, and in the lower temporal quadrant there was a small deep retinal hemorrhage. Vision = 20/30, the tension was normal; there was no unusual pain on pressure or motion, but moderate lacrimation and photophobia. The pain was excessive and out of all proportion to the appearance of the eye. A tentative diagnosis of iritis was made. The pain gradually subsided during the following twenty-four hours, but the nausea and stabbing sensations persisted. On the night of the twenty-third, while hot compresses were being applied to the eye, there was a sudden, complete, and quite dramatic cessation of all pain. Simultaneously a crescentic shaped object again came into the patient's field of vision where it has now persisted for more than a year.

On the morning of the twenty-fourth, one could observe immediately and without the slightest difficulty the astonishing picture shown in figure 1. Located in the more anterior portion of the vitreous body, and lying in the vertical plane was a beautifully symmetrical, amber-colored, tapered, and segmented, cigar-shaped foreign body, in length about 7 mm., and about one tenth as broad. Extending longitudinally through the middle was a lighter streak, bright gold in color. The parasite was divided horizontally into nine evenly spaced segments, terminating at its lower end in one elongated segment followed by a short segment. The segmenting lines appeared to be much darker in color and in them were interspersed at regular intervals more highly refractile dots, so that these rings appeared as if filigree work had been imposed upon them. Entomologists state that these rings are really rows of spikes or cilia. At the upper blunt end the superior border of the first ring was surmounted by a ring of fine cilia. This is best shown in the more schematic free-hand sketch which I made at the time of discovery (fig. 2B). Inserted in this end and extending down through the third segment is a Y-shaped stigma, each distal end club shaped. The details of the inferior end have never been clearly seen.

The general physical and laboratory examinations were entirely negative. There were no parasites in the stools, there was no eosinophilia, no general glandular or splenic enlargement—in short, nothing that pointed to a general invasion of the host.

Repeated examinations of the patient always showed the larva in the same position. No active motion was

ever seen either by the examiner or the patient. There was no further pain. The vision, which had been blurred, cleared very rapidly. Except for the annoying presence of the "zeppelin" which occasionally came into his line of vision, there was no further complaint from the patient. On July 30 he was sent to Dr. J. M. Wheeler, who advised against surgical intervention. The subsequent course of the disease proved the soundness of his advice. No change was seen in the appearance of the larva until the last of September, 1933, when it was noted that the upper part of the animal was becoming more swollen, and the more dependent half was shriveling. This process has continued, and now the parasite is shrunken and crumpled into a more angulated mass. The patient states it looks as if its back had been broken. Unquestionably, the larva died immediately after gaining entry into the globe and now the resistant chitinous skeleton is being absorbed. The vision remains 20/20 in each eye. Figure 3 is a drawing made in August, 1934.

The identity of this larva remains in doubt. F. C. Bishopp, Chief Entomologist of the United States Department of Agriculture, to whom the drawings were submitted, reported that they resembled very closely the first stage of the Gastrophilus intestinalis. C. H. Currin, assistant curator of the American Museum of Natural History, to whom the drawings were also submitted, thought the larva represented was most certainly a species of Gastrophilus, probably intestinalis. A photograph of one of these larvae is inserted for comparison (fig. 2A). Dr. F. W. O'Connor, who saw the drawings at the request of Dr. Wheeler, was inclined to identify the larva as that of the Cochliomyia (Chrysomyia) macellaria, in common parlance, the screwworm.

In searching the literature I have been able to find a total of eighteen cases of ophthalmomyiasis interna.

Case 1. Krautner[1] (Klagenfurt, Austria, 1900). A nine-year-old girl, struck in the eye during the previous summer by some insect, was found in January to have in the anterior chamber a motionless, semitransparent larva, 11 mm. long, divided transversely into seven segments. Intermittent attacks of pain and inflammation, culminating in iridocyclitis, hypopyon, and increased tension, brought the child to the physician. Upon attempted removal, death intervened under chloroform narcosis. The larva was identified as Hypoderma bovis.

Case 2. Ståhlberg[2] (Jönköping, Sweden, 1901): A five-year-old girl with an eye intermittently irritated from September to February, the attacks increasing in severity and lately associated with vomiting, was found to have a greyish, transparent, and segmented larva, 10 mm. long, in the anterior chamber. The larva was extracted and identified as the Hypoderma bovis. The patient made a complete recovery.

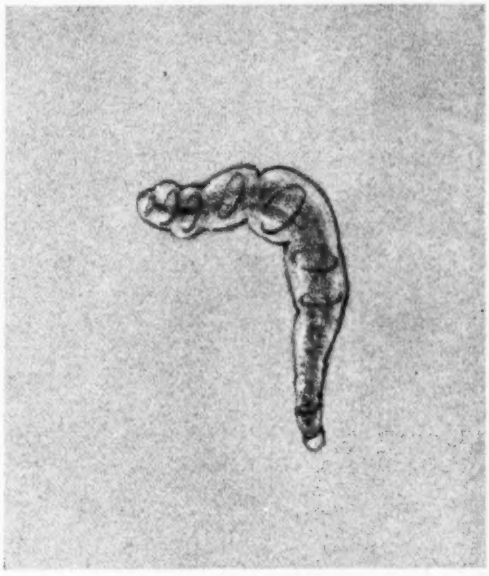

Fig. 3 (Anderson). Drawing of larva in the vitreous, as it appeared in August, 1934.

Case 3. Ewetzky and Von Kennel[3] (Dorpat, Russia, 1903) removed from the anterior chamber of a five-year-old boy a cylindrical, segmented, 7-mm.-long larva, unidentified. Five months previously (September) symptoms of irritation had appeared and increased in severity. Three weeks after the removal the patient had recovered 3/10 vision.

Case 4. Thomas and Parsons[4] (England, 1908). The eye of a three-year-old boy was enucleated by Thomas after he had found and observed in the anterior chamber a semitransparent, segmented, 12-mm.-long larva with eight segments. Several months previously, the child had developed the habit of starting suddenly as if something strange had come into view. Symptoms and signs of irritation had developed a few weeks before Thomas found iritis, hypotonia, posterior

synechiae, and a deep anterior chamber in the most dependent portion of which lay the parasite. The larva was identified as being most probably that of the blowfly or one of the Sarcophagae.

Case 5. Magiorre[5] (Italy, 1917) removed a larva from the anterior chamber of a sixteen-year-old boy. One end of the larva was attached to a small leukoma near the limbus, the other free end extended vertically into the anterior chamber. No further information is available.

Case 6. Bietti[6] (Italy, 1923) reports an 8-mm.-long greyish-white cylindrical larva, having eight segments, aspirated from the anterior chamber of a ten-year-old girl who two months previously (October) had been struck in this eye by a piece of wood. Progressive irritation, steamy cornea, increased tension, and loss of vision had brought the

Table 1

OPHTHALMOMYIASIS INTERNA ANTERIOR

No.	Year	Author	Geographical Distribution	Age	History and Physical Findings	Results	Identity of Larva
1.	1900	Krautner	Klagenfurt, Austria	9	First seen in Jan.—Periodic inflammation since insect bite over lid in summer. Tension plus. Hypopyon. Cornea and aqueous cloudy. Moderate ciliary injection. Larva in anterior chamber	Removal attempted. Death from chloroform	Hypoderma bovis
2.	1901	Ståhlberg	Sweden	5	Duration five months. Pain and irritation	Extracted. Recovery	Hypoderma bovis
3.	1904	Ewetsky and Von Kennel	Dorpat, Russia	5	Seen in Feb. Onset Sept. Duration 5 months. Exacerbations of inflammation. Pain. Cloudy iris and cornea. Turbid aqueous. Larva in anterior chamber	Extracted. Vision 3/10	Diptera
4.	1908	Thomas and Parsons	England	3	Onset: Indefinite, several months. Photophobia, irritation, discolored iris and pupil, turbid iris. Larva in anterior chamber	Enucleated	Larva of blowfly or sarcophaga
5.	1922	Magiorre	Italy	16		Extracted	No note
6.	1923	Bietti	Italy	10	Onset: October. Photophobia, pain. Descemetitis, iritis. Larva in anterior chamber	Aspirated	Hypoderma. Probably H. lineatum
7.	1924	Blessig and Kuriks	Dorpat, Russia	3	Recurrent attacks of phlyctenular kerato-conjunctivitis over a period of months	Extracted. Complete recovery	Hypoderma bovis or Rhinoestrus bovis
8.	1927	Hartmann	Emden, Germany	5	Onset: October. Irritation for 3 months. High-grade iridocyclitis. Larva in anterior chamber	Extracted. Vision 1/5	Probably Hypoderma bovis
9.	1929	Barczinski	Allenstein, Germany	6	Seen in February. Duration 10 days. Pain and loss of vision. Hypotonia, deep chamber. Larva in anterior chamber	Extracted. Vision 2/50	Hypoderma bovis
10.	1930	Grungarten	Russia		Article not available		

Table 2

OPHTHALMOMYIASIS INTERNA POSTERIOR

No.	Year	Author	Geographical Distribution	Age	History and Physical Findings	Results	Identity of Larva
1.	1913	Hess	Munich, Germany	4	Examined December. Onset insidious, 1 month. Painful at intervals. Slight ciliary injection, cloudy cornea—detached retina. Diagnosis: Tuberculosis	Enucleated	Hypoderma bovis
2.	1917	von Schmidt zu Wellenberg	Klagenfurt, Austria	5	Examined February. Onset 1 month previously. Cloudy cornea, suppurative choroiditis, detached retina. Tension 35. Traumatic glaucoma, probably due to percussion cap?	Enucleated	Diptera
3.	1920	Behr	Kiel, Germany	7	Onset: August—4 months' duration. Tension 38. Phlyctenules — cloudy cornea. Subretinal larva. Tuberculosis	Enucleated	Diptera. Probably Hypoderma bovis
4.	1925	Purtscher	Klagenfurt, Austria	9	Onset: July. Pain, loss of vision, deep anterior chamber. Iris discolored	Larva extracted. Vision lost	Hypoderma bovis
5.	1926	Zeeman	Amsterdam, Netherlands	6	Duration 4 months. Retinal separation. Subretinal larva	Enucleation	Diptera
6.	1931	Archangelsky and Braunstein	Moscow, Russia	4½	Pain beginning 1930. Seen 2 or 3 weeks after onset. Observation 2 months. Exacerbations. Hypopyon, hypotonia, deep anterior chamber. Detached retina. Diagnosis: Tuberculosis	Enucleation	Œstridæ
7.	1933	DeBoe	Miami, Fla., United States	48	Onset: May. Rapid loss of vision. Larva presents through optic foramen and moves into vitreous.	Optic atrophy	Chrysomyia
8.	1934	Ennema	Amsterdam, Netherlands	3	Onset: December. In May increased tension. Tumor protruding into vitreous. Diagnosis: Glioma or pseudo-glioma. Subretinal larva.	Enucleation	Diptera
9.	1934	Anderson	Durham, N.C., United States	46	Onset: July, with excruciating pain. Physical examination negative. After few days larva found in vitreous. No reaction in tissues of globe	No damage	Gastrophilus equi

patient to the clinic. The larva was identified as of the Hypoderma genus, probably lineatum.

Case 7. Blessig and Kuriks[7] (Dorpat, Russia, 1924) removed a 4-mm.-long, living larva, having nine segments, from the anterior chamber of a three-year-old girl. This child had been under observation for weeks, suffering from what was thought to be recurrent attacks of phlyctenular conjunctivitis.

After the removal the eye made a complete recovery. The larva was identified as Hypoderma bovis or the Rhinoestrus nasalis.

Case 8. Hartmann[8] (Emden, Germany, 1926) removed a segmented larva from the anterior chamber of a five-year-old boy who had had symptoms of increasing irritation of the eye for three months (since September). The larva was first seen through the pupil but during the course of a month, after partial dislocation of the lens, made its way into the anterior chamber. It was identified as probably Hypoderma bovis. Vision after the removal = 1/5.

Case 9. Barczinski[9] (Allenstein, Germany, 1929) removed a 10-mm.-long larva from the anterior chamber of a six-year-old boy who, without previous symptoms, developed during the first ten days of February a fulminating iridocyclitis with rapid loss of vision, hypotonia, deepened anterior chamber, and cloudy vitreous. The larva was identified as that of the gadfly. Vision was reduced to 2/50.

Case 10. Grungarten's[10] (Russia, 1930) report was not available in translation in the Surgeon General's office, and is mentioned here only for the sake of completeness.

I have been able to collect eight cases in which the larvae have been found in the posterior segment of the eye.

Case 1. Hess[11] (Munich, Germany, 1913) having made a preoperative diagnosis of ocular tuberculosis or glioma enucleated the eye of a four-year-old girl who for three months (since October) had suffered loss of vision with minimal inflammatory reaction, greenish reflex in the pupil, and descemetitis. Pathological report revealed a detachment of the retina under which was a 1½-cm.-long larva identified as Hypoderma.

Case 2. Von Schmidt zu Wellenberg[12] (Klagenfurt, Austria, 1917) having enucleated the eye of a five-year-old child on account of a suppurative chorioretinitis, presumably caused by the presence of a portion of a percussion cap, found on pathological examination the remnants of a larva which could not be identified. Preoperative examination had revealed amaurosis associated with increased tension and separated retina.

Case 3. Behr[13] (Kiel, Germany, 1920), on account of intense inflammatory reaction, removed the eye of a seven-year-old boy who had had symptoms of irritation for five months (since August) when, after a swelling on the cheek followed by a phlyctenular irritative condition at the corneal margin with a gibbous prominence in the sclerotica, separation of the retina with increased tension occurred. Preoperative diagnosis was glioma or tuberculosis of choroid. The pathological report was "subretinal larva, probably Hypoderma bovis."

Case 4. Purtscher[14] (Klagenfurt, Austria, 1925) discovered and removed a living larva from the vitreous of a nine-year-old boy who one week earlier (the first of August) had been awakened by a severe burning in the involved eye. While under observation, a separation and tear of the retina had taken place and the living larva had moved into the vitreous from which it was removed and identified as the Hypoderma bovis. The globe was preserved, but there was no return of vision.

Case 5. Zeeman[15] (Amsterdam, Holland, 1925) on account of increasing pain, phlyctenules, and progressive loss of vision, removed the eye of a six-year-old boy. Pathological examination showed a subretinal larva not further identified.

Case 6. Archangelsky and Braunstein[16] (Moscow, U.S.S.R., 1930) removed the eye of a four-year-old girl, having made a preoperative diagnosis of glioma or tuberculosis. Examination had revealed hypopyon, hypotonia, and iridocyclitis, which had appeared and increased in severity for the past month (since January). Pathological examination revealed a dismembered larva of the Oestrid group in the disorganized tissues of the posterior segment.

Case 7. DeBoe[17] (Florida, 1933) observed in May the entrance of a larva through the lamina cribrosa into the vitreous body. The patient, aged forty-eight years, had sought the advice of a physician because of a sudden blindness one hour previously. At the time of the report the larva had remained inactive, but there had been an optic atrophy. The larva of some families of the Diptera are transmitted by ticks, and the fact that the patient had been bitten by these parasites a few weeks previously may have had some significance.

Case 8. Ennema[18] (Amsterdam, Holland, 1934) reported the finding of a subretinal larva in the enucleated eye of a three-year-old boy. At Christmas, 1931, the mother had first noticed that the child had "a dull expression." On examination in May, 1932, there were revealed: a normal cornea without keratitic precipitates or circumcorneal injection, shallow anterior chamber, eccentric and fixed pupil, atrophy of iris, posterior synechiae, yellowish-green fundus reflex, tumor protruding into the vitreous body, and increased tension. The preoperative diagnosis was pseudoglioma or glioma. The past history was noncontributory.

Comment

Reference to tables 1 and 2 will show that the Hypoderma bovis has been most frequently identified as the offending larva in these cases. Such an identification is incompatible with the more recent knowledge of the life cycle of this species, since in the majority of the cases cited above there is not a sufficient lapse of time between the onset of the disease and the appearance of the larva in the eye to permit the migration of the parasite from the esophageal mucosa, where it is now known

to be hatched, to the eye. The history in several of the cases cited would indicate that the larva was deposited in or about the eye by a viviparous fly and that the boring into the globe was begun at once. This would explain the paroxysms of pain in the case which I have reported. It will be noted that all the cases reported prior to that of DeBoe have been in children. This has been taken by the German contributors as an indication that the child's sclera is less resistant to the inboring of the larva than that of the adult. While in DeBoe's case it may be argued that the larva came by chance to the posterior foramen and so into the globe, this view would not hold in my case, in which it appears that the entrance was made at some other point in the sclera. It would appear that the symptoms, signs, diagnosis, and prognosis depend more upon the location of the larva in the eye than upon its identity. In the anterior chamber diagnosis is not so difficult once the larva comes into view. Before its appearance, the diagnosis of tuberculosis was made in two cases. When the larva is free in the anterior chamber, removal seems to offer a fair chance of success; but if the larva elects the posterior segment, the diagnosis becomes much more difficult. When the location is subretinal, glioma or tuberculosis is most often suspected, and the eye removed. When the larva moves into the vitreous the injury to the eye is less severe, and the diagnosis made easy; also my case would indicate the prognosis much more favorable.

Summary

The second case of ophthalmomyiasis interna posterior occurring in North America is reported. This is also the second case known to have occurred in an adult, and the only case so far recorded in which after eighteen months there has been no visible injury nor visual loss through the presence of the parasite.

1110 West Main Street.

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SODIUM CONTENT OF AQUEOUS, VITREOUS, AND SERUM

A Comparative Study on Oxen

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Comparative studies of sodium concentrations in the aqueous, vitreous, and serum of the same animals were made. Sodium concentrations were also studied in respect to the age of the animal. The sodium contents of the aqueous and vitreous were identical, apparently not appreciably affected by the age of the animal; that of the serum exceeded that of the aqueous and vitreous in all ages, and the serum of calves appeared to contain slightly more sodium than that of adult cattle. From the Department of Ophthalmology, College of Medicine, State University of Iowa.

The first comparative study of sodium concentrations in the aqueous, vitreous, and blood of the same animals was made by Lebermann[1] in 1925. He found average sodium values per 100 gm. of fluid as follows: oxen—294 mg. for aqueous, and 272 mg. for vitreous; rabbits—320 mg. for aqueous, 300 mg. for vitreous, 470 mg. for arterial blood, and 470 mg. for venous blood. In 1927 Tron[2] published data from his studies of sodium in the aqueous, vitreous, and serum of oxen, giving the respective average values per 100 gm. of the fluids as 339, 338, 331 mg. In the same year Duke-Elder[3] published a report on the aqueous and serum of horses. His, contrary to Tron's, results showed the sodium content of aqueous to be appreciably less than that of serum, the averages per 100 c.c. being 287.7 and 335.1 mg., respectively. Recently, Stary and Winternitz[4] published data from their studies on the sodium content of aqueous and serum of oxen; their results, however, differed diametrically from those of Duke-Elder. Their averages per 100 gm. of the fluids were 348.0 mg. for aqueous, and 315.0 mg. for serum. It is to be noted that Lebermann and Tron estimated the quantities of fluids gravimetrically, while Duke-Elder employed the volumetric method. It is not known what technique Stary and Winternitz used. The disadvantage of a certain type of gravimetric procedure, which appears to be most widely used in some European countries, has been pointed out in the writer's publication on calcium[5]. Furthermore, the author has studied carefully the sodium methods employed by all the abovementioned investigators and found that it is extremely difficult to obtain consistent results with any of them. In view of the disagreements between the results thus far published on the relative sodium concentrations in the aqueous, vitreous, and serum, and in view of the fact that the author[6] has devised a new sodium method by which reliable results can be obtained, it was considered advisable to repeat the work of previous investigators.

In the present study sodium was determined in the aqueous and vitreous of strictly fresh eyes (3-5 minutes after death of the animals), and also in eyes

Table 1

MINIMUM, MAXIMUM, AND AVERAGE SODIUM VALUES OF NORMAL AQUEOUS AND VITREOUS HUMORS AND SERUM OF OXEN*

	No. of Animals	Aqueous mg.%	Vitreous mg.%	Serum mg.%
Calves, 4–8 wks.	9	324.6–357.8	317.3–347.1	364.3–390.8
Averages		334.8 (16)	333.2 (18)	375.3 (12)
Young adults, 1–2 yrs.	9	300.0–351.3	300.6–353.2	327.9–388.2
Averages		333.5 (18)	333.2 (20)	355.1 (8)
Adults, over 5 yrs.	4	324.3–351.8	329.7–360.0	359.9–375.3
Averages		337.8 (7)	344.3 (7)	368.8 (4)

Table 2

MINIMUM, MAXIMUM, AND AVERAGE SODIUM VALUES OF AQUEOUS AND VITREOUS OF SAMPLES NOT STRICTLY FRESH (2 HOURS AFTER DEATH OF THE ANIMALS—YOUNG ADULTS)*

No. of Animals	Aqueous mg.%	Vitreous mg.%	Serum mg.%
4	327.9–383.2 351.8 (8)	326.1–355.5 344.6 (8)	349.2–368.8 360.6 (4)

* Figures in parentheses indicate the number of analyses.

that had been allowed purposely to stand for a few hours after their removal. The aqueous was withdrawn with a 2-c.c. graduated syringe and measured out directly. The vitreous was removed through a posterior incision and filtered before analysis. The contents of each eye were analyzed separately, the method requiring only 0.1 c.c. of each of the fluids, and therefore necessitating no pooling of aqueous. An effort was made also to study the sodium concentration with respect to age. Only approximate ages could be obtained, and the animals were grouped as follows: calves, 4-8 weeks; young adults, 1-2 years; aged cattle, above 5 years.

As may be seen from the accompanying table 1, the sodium content is practically the same for both aqueous and vitreous. There are also practically no differences in the sodium concentration with respect to age. Thus the average values for calves, expressed in terms of milligrams of sodium per 100 c.c. of the fluids, are: 334.8 for aqueous, and 333.2 for vitreous. The respective figures for young adults are: 335.0 and 333.5 for fresh eyes, and 351.8 and 344.6 for eyes that had stood 2 hours after death of the animals. For aged cattle the sodium contents of aqueous and vitreous are 337.8 and 344.6 mg. percent respectively. In agreement with Duke-Elder's results, the sodium content of serum, however, exceeds definitely that of the aqueous and vitreous in all age groups, except in three young adults, the average serum values being 375.3 mg. percent for calves, 360.6 mg. percent for adults, and 368.8 mg. percent for aged cattle. Although the differences between the last two groups of figures are within the range of experimental error, it appears that the sodium concentration of calves' serum might contain slightly more sodium than that of adult cattle. If no age discriminations are made and the averages are computed on the basis of the combined data on calves, young adults, and aged cattle, except the values listed in table 2, then the figures are as follows: 334.6 mg. percent for aqueous, 333.6 mg. percent for vitreous, and 364.4 mg. percent for serum. The average sodium content of the aqueous of eyes that had stood for 2 hours before the withdrawal of the fluid is slightly higher than that for strictly fresh eyes, the discrepancy evidently being due to concentration of aqueous as a result of evaporation through the cornea.

	Calves 4-8 weeks	Young adults 1-2 years	Aged cattle above 5 years
Aqueous	334.8 mg.%	335.0 mg.%	337.8 mg.%
Vitreous	333.2 mg.%	333.5 mg.%	344.6 mg.%

Summary

Comparative studies of sodium concentrations in the aqueous, vitreous, and serum of the same animals were made. The sodium concentrations were studied also with respect to age of the animals. The sodium contents of the aqueous and vitreous are identical, and do not appear to be appreciably affected by the age of the animal, the average values being as follows:

When the eyes were allowed to stand for approximately 2 hours after enucleation, the sodium content of the aqueous increased (351.8 mg. percent),

evidently as a result of concentration of the aqueous in consequence of evaporation through the cornea. A lesser increase of sodium was noted in the vitreous (344.6 mg. percent).

With few exceptions, the sodium content of serum exceeds that of the aqueous and vitreous in all ages, the average serum values being as follows: 375.3 mg. percent in calves (4-8 weeks), 360.6 mg. percent in young adults (1-2 years), and 368.8 mg. percent in aged cattle (above 5 years). Thus the serum of calves appears to contain slightly more sodium than that of adult cattle. The average sodium values, based on the combined data, of calves, young adults, and aged cattle are: 334.6 mg. percent for aqueous, 333.6 mg. percent for vitreous, and 364.4 mg. percent for serum. Serum, therefore, contains approximately 9 percent more sodium than does either the aqueous or vitreous.

Dr. C. S. O'Brien, Head of the Department of Ophthalmology, gave valuable help throughout the work.

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GLAUCOMA ACCOMPANYING NEVUS FLAMMEUS

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Two new cases of nevus flammeus with glaucoma are added to the 61 cases previously reported. In one of the two cases reported by the author, as well as in 9 of the 13 cases mentioned in the literature in which histological findings are reported, there were angiomatous changes in the uvea. In all of the 14 cases the capillaries were found to be dilated. The author believes that an increased formation of aqueous, eventually overburdening the filtration angle, is a definite factor in bringing about increased intraocular pressure. From the Harvard Medical School, Department of Ophthalmology, and the Massachusetts Eye and Ear Infirmary. Read before the American Ophthalmological Society, in Lucerne-in-Quebec, Canada, July, 1934.

Although the association of nevus flammeus and glaucoma has been recognized for many years, it is a relatively rare condition, 61 cases having been reported. In these, only 13 eyeballs have been examined histologically. I have two additional cases to report, with histologic studies in one of them.

Reports of cases

Case 1. Eugene T., a white laborer, aged twenty-one years, was admitted to the Massachusetts Eye and Ear Infirmary on August 26, 1932, complaining of poor vision. There was no family history of eye disease. The patient had always been well, except that in early childhood he had had attacks of twitching of the left arm. In the past three years he had had two convulsions, during which he was unconscious for a few minutes. The visual acuity had always been poor, but in the past few months it had become worse and he had begun to notice halos around lights. There had never been any pain nor inflammation of the eyes.

Physical Examination. The patient presented a generalized vascular nevus covering not only the face, but practically the entire body. The heart, lungs, and kidneys were normal. The teeth were carious. The nose and throat were essentially normal. Neurologic examination showed an atrophy of the entire left side of the body, with diminished reflexes. The intelligence quotient was low.

Laboratory Examination. The Hinton test of the blood was negative. Urinalysis was negative. X-ray examinations of the skull were negative.

Ocular Examination. The visual acuity was 6/21 in the right eye and only shadows in the left. The eyeballs appeared to be enlarged, and the scleras seemed to be thin and bluish. There were many groups of tortuous vessels on the conjunctivae. The horizontal corneal diameter was 12 mm. in the right eye and 14 mm. in the left. The anterior chambers were somewhat deeper than normal. The pupils responded normally to light and in accommodation. Slitlamp examination revealed normal irides. The fundus of each eye showed many tortuous and dilated vessels in the retina and choroid. The discs were deeply cupped. With the new Schiötz tonometer the tension measured 48 mm. Hg in the right eye, and 45 mm. Hg in the left. Due to complete lack of cooperation and decidedly low intelligence no accurate field studies were possible. Vigorous myotic treatment failed to reduce the tension more than two or three points in either eye. An Elliot trephine operation was performed on the left eye. Just as the iridectomy was completed an expulsive hemorrhage occurred. A few days later this eye was enucleated.

I was then faced with the problem of what course to pursue for the remaining eye. The tension continued high (between 45 and 50 mm. Hg) notwithstanding the use of various myotics. Glaucosan was tried without results. At Dr. Verhoeff's suggestion I finally decided to do a simple incision, such as Reese used in his operation for iridectomy. The patient was given 20 grains of calcium lactate three times daily for a week before the operation. Two hours before the operation he re-

ceived 50 c.c. of a 50-percent glucose solution intravenously. Theoretically, this should have reduced the intraocular pressure by increasing the osmotic pressure of the blood. As a matter of fact, it did not have any effect whatever on the tension, which still remained at 50 mm. Hg just before the operation was begun. This suggested a true change in the permeability of the blood vessels.

Fig. 1 (Dunphy). Generalized vascular nevus with glaucoma.

A Reese incision was made, without complications developing. The aqueous gradually leaked out of the anterior chamber, and the iris slowly extruded itself beneath the conjunctiva. Gentle stroking over the iris with a spatula caused it to evert itself so that the pigment-epithelium layer was uppermost. Recovery was uneventful. The course of the patient was followed at intervals for eighteen months. The tension was never over 25 mm. Hg, and he consistently maintained a visual acuity of 6/21.

Pathologic examination of the enucleated eye was made by Dr. Theodore L. Terry.

Macroscopic Examination. The globe was more or less normal in size and shape, although there was a slight dimpling near the optic nerve on one side, probably due to shrinkage. A large spicule of bone was embedded in the choroid on one side. This bone was removed before an attempt was made to cut the globe for microscopic sections. The retina was separated from the fundus, and formed a mass just behind the lens. The choroid and ciliary body were separated by a large hemorrhage. The choroid appeared to be thickened grossly. The vitreous was markedly discolored with blood. There was a filtering cicatrix above.

Microscopic Examination. On one side there was an anterior peripheral synechia. On the other side the ligamentum pectinatum was sclerosed and the canal of Schlemm was closed. The entire uveal tract was heavily pigmented. There was an abnormal amount of melanotic pigment throughout the sclera; the pigment was particularly evident in the regions of the emissaria. The iris was somewhat fibrosed, and contained some small areas of necrosis; there was an ectropion uvea. The lens was normal and *in situ*. The vessels of the choroid and ciliary body were distended. At one place, near the site of the choroidal hemorrhage, the choroidal vessels were not only distended, but were also increased in number, and the endothelial cells were abnormally thick, resembling those of an angioma.

Case 2. Laura K., a married white woman, aged fifty-nine years, came to the outpatient department on August 7, 1930, complaining of poor vision. The family history was irrelevant. The patient had always been well, and had two healthy adult children. The visual acuity had been good until a year ago, when she suffered an attack of ulcerative keratitis of the left eye. Since then the vision in the right eye had also become blurred.

Physical Examination. The patient showed a nevus flammeus of the right

side of the face, involving the lids, nose, and forehead. The heart, lungs, kidneys, and blood-pressure were normal. Neurologic examination was negative.

Laboratory Examination. The Hinton test of the blood was negative. Urinalysis was negative. X-ray examinations of the skull were negative.

Ocular Examination. The visual acuity was 6/15 in each eye with the refractive error corrected. The eyeballs were of normal size, and the conjunctivae were also normal. With the new Schiötz tonometer the tension measured 42 mm. Hg in the right eye, and 20 mm. Hg in the left.

The right eye showed a normal cornea and anterior chamber. Examination with the slitlamp revealed no abnormalities of the iris. The lens was clear. There were one or two floating vitreous opacities. The fundus showed glaucomatous cupping of the disc. The retinal vessels appeared to be normal. The visual field revealed a definite nasal step, with an inferior nasal contraction and a beginning Bjerrum scotoma.

Except for superficial opacities of the cornea the left eye was normal.

After myotics had failed to reduce the intraocular pressure, an Elliot trephine operation was performed on the right eye, with successful reduction of the tension. A year later the tension had again increased to 40 mm. Hg, and an iridotasis was done above and temporally. Since then the tension has ranged between 22 and 31 mm. Hg. When last seen, in February, 1934, the visual acuity was: right eye, 6/21; left eye, 6/15. The tension was 26 mm. Hg in each eye.

Discussion

Of the 61 cases of nevus flammeus associated with glaucoma recorded in the literature, I will mention only a few of the outstanding ones.

Schirmer in 1860 was the first observer to recognize the relationship of the two conditions by reporting a case of telangiectasis of the face associated with buphthalmos.

Sturge in 1879 reported a case of facial nevus accompanied by buphthalmos in which there were epileptiform attacks on the opposite side of the body which were believed to be due, in all probability, to a nevoid condition of the brain.

Quackenboss and Verhoeff in 1908 reported a case of a girl, aged eleven

Fig. 2 (Dunphy). Nevus flammeus with glaucoma.

years, who presented a blind glaucomatous eye and a port-wine-colored nevus of the lower eyelid and cheek of the same side. Enucleation was performed, and an angioma of the choroid was found, with blocking of the filtration angle by the root of the iris. A detached retina was also present. Degenerative changes were evidenced by a calcareous cataract and ossification of the choroid.

A similar case was reported by Love in 1914. This patient was a man, aged twenty years, with a blind buphthalmic eye and a nevus covering the same side of the face. Examination of the enucleated eye revealed an angioma of the choroid, total detachment of the retina, and the iris angle blocked with adhesions.

Similar cases showing angioma of the choroid at histologic examination have been reported by Milles, Snell, Stoewer, de Haas, Steffens, Wageman, Love, and Jahnke. In some of these cases the iris angle was blocked by connective tissue.

Safar in 1923 presented a case of facial nevus involving both sides of the face and the mucous membrane of the mouth. Glaucoma was present in the one eye only. Histologic examination of this eye showed an iris poor in crypts, the scleral spur displaced backward, and Schlemm's canal narrowed. Safar was of the opinion that in this case the glaucoma was due to interference with the excretory channels of the eye.

At the meeting of this Society in 1927, Arnold Knapp reported a case of a boy, aged eleven years, with nevus involving the face, gums, hard palate, and upper extremities. Bilateral glaucoma was present. The irides contained grayish nodules and dilated vessels. Knapp successfully controlled the intraocular tension by trephining. Microscopic sections of the excised iris tissue showed great proliferation of the endothelial cells, with many newformed vessels, suggesting an angiomatous condition. In some places the cells were crowded together in layers, producing the grayish nodules observed grossly. Knapp was of the opinion that the iris changes, by extension to the periphery, had obstructed the filtration angle.

The following year Clausen examined histologically a case of unilateral nevus and buphthalmos, and found no changes whatever in the iris angle nor in Schlemm's canal.

Weber also, in a histologic study, found no changes in the iris angle of the enucleated eye of his case.

In 1932 Tyson reported an interesting case of nevus of the face and globe associated with glaucoma, vascular changes in the iris, and a calcified vascular growth in the left occipital lobe of the brain, with right homonymous hemianopia. Examination with the gonioscope showed the angle of the iris to be entirely free of adhesions. Within three hours the fluorescein test (internal administration) gave a marked greenish color to the aqueous in the left eye, on the side of the nevus, and showed no staining of the aqueous in the right eye, indicating an increased permeability of the vessels in the eye with glaucoma. Tyson concluded that the glaucoma was produced by the formation of a plasmoid aqueous which blocked the iris angle.

The frequent occurrence of angioma of the choroid in association with nevus flammeus of the eyelids and face suggests a common origin for these tumors. It is believed that the growth of the blood vessels is regulated by the vasomotor nerves. During the developmental period of the vascular system some defect of these vasomotor nerves might impair this regulatory influence and allow an abnormal growth of blood vessels to take place, thus forming a nevus. According to Verhoeff, the development of vascular nevi takes place as follows: First, there is a destruction of, or an absence of, the function of the vasomotor nerves, which is followed by a dilatation of the vessels. Next, the dilatation of the vessels produces a local increase in the tension of the capillaries, and then there is produced a compensatory hypertrophy which, on account of the thinness of the walls, is manifested as a new growth of capillaries.

Von Barensprung in 1863 was the first observer to advance the nerve theory of nevus of the skin. He stated that (1) nevi usually appear on half the body, not overlapping the midline; (2) they are manifested as streaks or spots on the skin which show an arrangement corresponding to the peripheral distribution of one or more spinal nerves; and (3) the degeneration of the skin depends essentially upon a hypertrophy of the papillae of the skin, the same structures in which the peripheral nerves end. Von Barensprung believed that a congenital disease of a single spinal ganglion originating in the uterus is the cause of the skin degeneration which developed in the peripheral region of the corresponding spinal nerve.

Cushing in 1906 described cases of intracranial hemorrhage associated with facial nevi in the region of the fifth-nerve distribution and with buphthalmos.

It is well known that intracranial changes occur in cases of nevus flammeus. A number of the reported cases gave a history of epileptiform seizures, and in several a hemiplegia was found. In eight cases, x-ray examinations of the skull revealed calcified vascular changes.

Many theories have been propounded to account for the occurrence of the glaucoma in these cases of nevus flammeus. Beltman was of the opinion that the blood pressure was abnormally elevated in the thin-walled veins of the choroid, and that this condition produced an extensive transudation of fluid. Freese believed that interference with the sympathetic-nerve supply was a causative factor. Cabannes asserted that the excessive amount of nourishment supplied to the tissues from the choroidal nevus caused a congenital hypertrophy of the eyeball. Bär believed that slowing of the blood stream, due to telangiectatic changes in the choroid, was the cause. Hudelo stated that there might be an obstruction to the outflow of blood from the cavernous sinus, which in turn caused a venous stasis within the eyeball. Aynsley's theory was that trauma to the branchial clefts caused the formation of a cerebral nevus, and this affected the developing eye, resulting in imperfect development of the canal of Schlemm.

Of the 14 cases, including my own case, that have been examined histologically, 10 showed angioma of the choroid. In one case there were irregularities of Schlemm's canal and the scleral spur. In one case angiomatous changes in the iris extending to the iris angle were present. In the remaining two cases no angioma nor any obstruction of the iris angle was found.

It would seem probable, therefore, that in most cases the glaucoma can be ascribed to an obstructed filtration angle, due to angiomatous changes in the uvea, or to adhesions in the iris angle resulting from the toxic action of degenerative changes within the eyeball. The bone formation in the choroid that occurred in my case is a striking example of the degenerative changes that may occur. In those cases in which the filtration angle has been shown to be normal some other factor must be present. Tyson's suggestion that the anterior chamber is blocked by a plasmoid aqueous resulting from changes in capillary permeability seems to me to be extremely logical. We have no proof, however, that in these cases the aqueous is truly plasmoid; that is, whether its protein content approaches that of the blood, as no one, so far as I know, has made determinations on the aqueous in these cases. Nevertheless, we do know that any condition which tends to dilate the intraocular capillaries leads to an increased protein content of the aqueous. This augmented protein content tends to produce an increased formation of aqueous by reducing the difference in the osmotic pressure of the blood and the aqueous. The amount of aqueous formed in any unit of time is therefore increased.

In the first case which I reported, an intravenous injection of glucose had no effect on the intraocular tension. This fact lends support to the theory of abnormal permeability of the intraocular capillaries. In a normal eye an intravenous injection of glucose would certainly have reduced the tension by increasing the osmotic pressure of the blood. In my case there must have been a rapid exchange of the glucose from the blood to the aqueous, so that their respective osmotic pressures approached each other.

In all the cases that have been examined histologically the intraocular capillaries have been dilated. I believe that it is fair to assume that an increased formation of aqueous occurs, which eventually may become too much for the filtration angle to handle, and that this condition is a definite factor in the occurrence of the glaucoma.

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SOME CLINICAL OBSERVATIONS ON ANISEIKONIA

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Aniseikonia is the condition of asymmetry in the relative size and shape of the ocular images and is a frequent cause of ocular discomfort continuing after correction of ordinary refractive errors and phorias. A discussion of the first 60 cases is given; also the prerequisites for the test, the technique of the examination with a description of the instrument (ophthalmo-eikonometer), and a descripion of the type of lenses and principles involved in the correction of the asymmetry of the size of the ocular images found in the examination. The cases were referred by oculists in New York and vicinity because of continuing discomfort after they had carried out the ordinary procedures. For 62 percent of these patients total relief was obtained, 10 percent were considerably improved and 28 percent not materially helped. From the Aniseikonia Department of New York University Medical School.

From February to August, 1934, approximately sixty patients were measured on the ophthalmo-eikonometer, to determine if any asymmetry in the relative size and shape of the ocular images (aniseikonia) were present which might be a possible cause of continuing ocular discomfort.

Discussion

A. **The symptoms** in order of frequency of occurrence that have been encountered in patients with aniseikonia, are:

1. Persistent discomfort related to the eyes or head, despite the application of other procedures, present in most of the cases.
2. Aching in the eyes or head, usually worse on concentrated use (54 percent).
3. Photophobia for artificial light or daylight (46 percent).
4. Fatigue on use (41 percent).
5. General nervousness on attempting concentrated use of the eyes (40 percent).
6. Burning, itching, and various difficulties with reading (26 percent).
7. Tearing (25 percent).
8. Sleepiness (15 percent).
9. Vertigo (15 percent).
10. Numerous other symptoms related to the use of the eyes, such as slow reading, shutting one eye on reading, and gastro-intestinal symptoms.

The symptoms of the patients in this series of cases had remained unchanged, though in most of the cases there had been many changes in lenses previous to the iseikonic ones prescribed to correct the visual asymmetry. Most of the patients have been referred from the private practices of the outstanding ophthalmologists of New York and its vicinity. In most of the cases the spherical and cylindrical strength of the lenses remained unchanged, the size factor only being added.

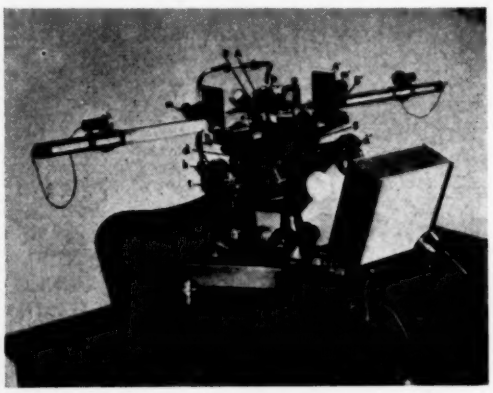
B. **The prerequisites for the test** for aniseikonia, are:

1. Sufficient vision to discern the spots on the screen (fig. 2) with the better eye (about 20/30), and the lights with the poorer eye (about 20/50).
2. Fusion: Ability to see simultaneously the spots with one eye and the lights with the other, while at the same time, fusing the images of the large central fixation spot on corresponding areas of the retinae 4 degrees from the fovea.
3. No manifest deviation. With the instrument as it is now constructed, it is impossible to measure accurately patients with a diplopia in which the images cannot be spontaneously superimposed by the extraocular muscles.

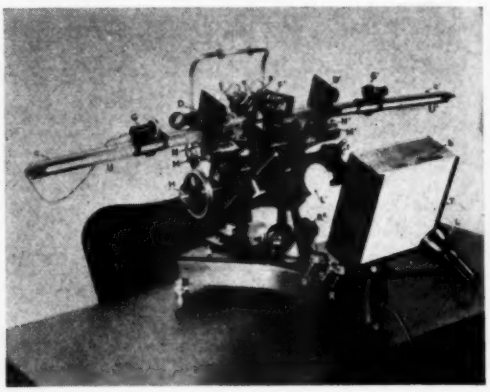
C. **The technique** of the examination is that originally developed in the Department of Research in Physiological Optics at Dartmouth College, by Professor A. Ames, Jr., and his staff.

The instrument used to measure visual asymmetry—the ophthalmo-eikonometer—is shown in figure 1. There are several cells for holding the lenses, so arranged that the optical axis of the lenses may be made to correspond with the optical axis of the eyes for 20′ and also for 16″, as in reading. The instrument is adjustable so that the rear lens may be placed 14 mm. from the apex of each cornea. The head

rest is adjustable so that the pupils may be centered. A flat white screen (fig. 2) is placed at 20′ in front of the patient's corneae. There is a black disc for fusion, centrally, and 4 degrees away from the center are placed four small holes, one above, one below, and one on each side (right and left) of this disc.



A



B

Fig. 1 (Hughes). The ophthalmo-eikonometer (A) adjusted for distance and (B) for near.

Behind each of these holes, is a light which is so arranged that, with the patient properly seated at the instrument, it can be seen by only one eye (whichever the examiner wishes) the other eye seeing the hole as a black dot. The patient is directed to look through the instrument, at the central black disc on the screen and then to the upper small spot, the larger spot in the center serving as a fusion object. The patient is asked whether the light seems to be exactly level with, or a little above, or below the center of the dot. The same procedure is repeated for the lower dot. If the lights are directed towards the right eye, the left eye sees only the dots. If the apparent position of the upper light is higher than the dot and the lower light below its corresponding dot, the vertical diameter of the image of the right eye, as represented by the lights, is greater than the image of the left eye, as represented by the dots (see fig. 3). On looking to the right and left dots, if the lights are to the right and left of their respective dots, the horizontal measurement of the right image (represented by the lights) is greater than the left, as in figure 3. Again, if each of the horizontal lights is to the left of its dot (as in exophoria) the left one being farther to the left than the right one, the lights are still farther apart than the dots and the right image is again larger horizontally. If, on the other hand, the lights all appear inside their corresponding dots, as in figure 4, the image of the right eye is smaller in both meridians than that of the left. By adjustment of the lenses in the instrument, the smaller image is enlarged in the proper meridian. The same measurements are repeated, using a chart in reading position, at 16″, which is a replica of the screen used at 20′. At the same time, the distance of the plane of focus of each eye is checked by a haploscopic mirror arrangement, by means of which a small light in the instrument itself is projected onto the central black spot on the screen. The instrument is adjusted so that this light is brought into clear focus. If each eye is not focused at the same distance when looking at this black spot at 20′, the spherical strength of the refracting lenses in the ophthalmo-eikonometer is altered and the plane of focus again checked until they are equalized, after which the size is again adjusted to equality. The final measurements represent not only equality of size, but equality of focal plane as well.

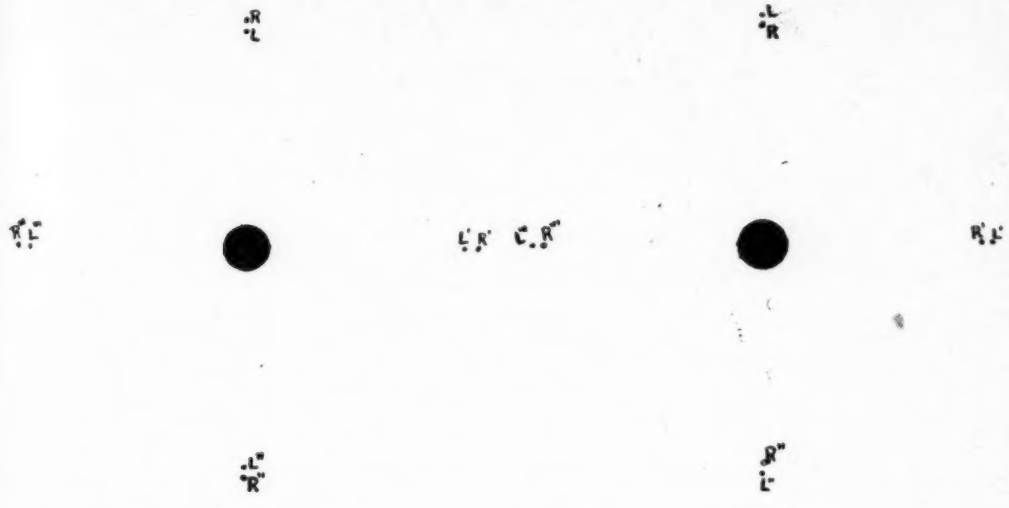


Fig. 3 Fig. 4

Fig. 3 (Hughes). Left micreikonia, right megaleikonia. The lights (R R′ R″ R‴) seen by the right eye and the dots (L L′ L″ L‴) by the left eye. The distance between the upper and lower lights (R and R″) is greater than the distance between the upper and lower dots (L and L″); and the horizontal lights (R′ and R‴) are farther apart than the horizontal dots (L′ and L‴). The right image is greater in both vertical and horizontal meridians.

Fig. 4 (Hughes). The lights are all inside their corresponding dots. The right image is smaller than the left (left megaleikonia or right micreikonia).

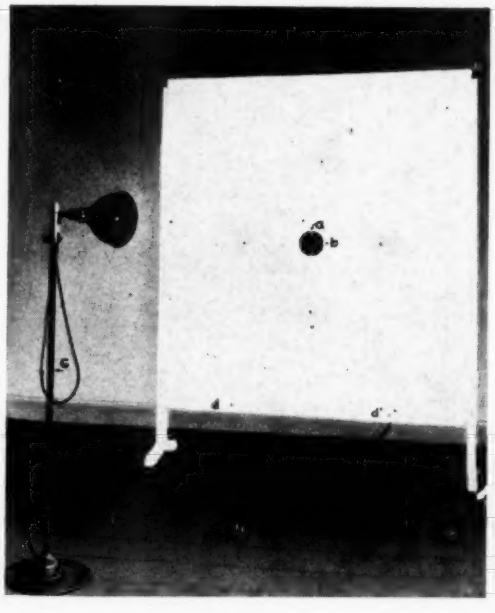


Fig. 2 (Hughes). The screen. The four small black dots are circular holes through which lights are directed towards one eye, the other eye seeing the holes as black dots.

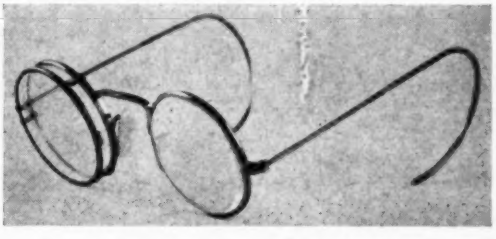


Fig. 5 (Hughes). Double-eye-wire type of iseikonic spectacles. The extra-size lens is held in front of one of the power lenses, sometimes one is needed in front of each lens.

Fig. 6 (Hughes). Single-eye-wire type of iseikonic glasses, designed so that both lenses are held in a single eye wire.

When aniseikonia is found and measured, special lenses are used for its clinical correction. They are calculated to correct the refractive error and also, by taking into account the effect of variation in their thickness and curvatures, the size and shape of the two images are equalized. By means of double lenses, with an intervening air space, an additional magnification effect may be produced. The glasses are made up in different styles, the double-eye-wire type and the single-eye-wire type.

In the double-eye-wire type, as illustrated in figure 6, an additional lens in a second rim is clipped on in front of one (or both) of the power lenses. The second or size (fitover) lens, is usually a zero power lens, which, depending on its thickness and curvatures, produces a definitely calculated enlargement, either in all meridians (over all) or in one meridian (meridional), or a combination. This is the so-called temporary type which is first supplied to the patient: (1) to determine during the trial period, if the correction of the aniseikonia will relieve the symptoms, and (2) to have the patient wear the size correction found on the first examination, so that the measurements may be checked over, two or three weeks later, before the more expensive single-eye-wire (or permanent) type is made.

In this latter type, if a double lens is required, the two component lenses are calculated and designed in such a way that the edges will come in contact and may be cemented. The air space is of a certain determined amount between these two lenses, varying with the amount of magnification required. The thickness and curvatures of front and back surfaces of the lenses are calculated by referring to a series of tables prepared by the Department of Research in Physiological Optics at Dartmouth, to produce the magnification and refractive power found at the examination.

D. **The findings.** The first sixty cases examined, showed the following:

1. In 20 cases the image of the right eye was smaller (or equal) both for distance and near in both vertical and horizontal meridians. For distance, the average difference vertically, was 1.07 percent and horizontally 1.27 percent; while at near, the average difference was vertically, 1.17 percent and horizontally 1.32 percent.

2. In 15 cases, the left image was smaller (or equal) both for distance and near in both vertical and horizontal meridians. For distance, the average asymmetry amounted to vertically 1.59 percent and horizontally 2.11 percent; and for near, the average difference was vertically, 0.88 percent and horizontally 1.81 percent.

3. In 12 cases, the vertical meridian in one eye and the horizontal in the other were smaller (or equal), the same meridian being the smaller for both distance and near.

4. In 9 cases, at least one of the meridians was smaller for distance and larger when the eyes were adjusted for near range.

5. In 1 case the measurements were so uncertain as to be of no value.

6. In 3 cases there was insufficient fusion sense for the measurements.

7. In 1 case, no aniseikonia existed when the refractive error was corrected with lenses ground on Tillyer curves. This was true despite the fact that there was considerable anisometropia.

R.E. —1.25 diopters
L.E. —2.50 diopters

E. **The results.** Iseikonic lenses were prescribed and obtained by the patient in 47 cases:

1. 29 or 62 percent were totally relieved of their distressing symptoms.

2. Five or 10 percent were considerably helped.

3. Thirteen or 28 percent were not materially helped.

Any procedure that will help this unfortunate class of patients is to be welcomed. They have symptoms, varying from extreme prostration to very slight discomfort, which usually continue regardless of accurate correction of refractive error and muscle anomalies by various means. Frequently they have little or no refractive error. Their vision is usually remarkably acute, this, in all probability, being one of the rea-

sons why they have trouble. If their vision were not so acute, they would not have symptoms from small asymmetries of their visual images.

We have been able totally to relieve over 60 percent of patients in this series of cases of aniseikonia and very materially to help another 10 percent. In about 30 percent of the cases, correction of the aniseikonia has not been of any real assistance to the patient. A number of them did not or could not return as requested for further examination and it is possible that further tests would have resulted in relief to some of this latter group.*

In some of the cases in which a definite amount of aniseikonia was found and rechecked, we were disappointed to obtain no relief of symptoms where we had anticipated distinct relief. This, despite the proof of visual symmetry by examination with the patient wearing iseikonic lenses.

On the other hand, there were some patients who obtained partial relief by the correction of only a small amount of visual asymmetry. This group may be characterized as having symptoms out of all proportion to their ocular error; the correction of this group is indeed spectacular and very gratifying.

Conclusions

A frequent cause for continuing ocular discomfort is aniseikonia. The correction of this asymmetry results in the relief of the majority of disturbing symptoms in this difficult group of patients.

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* A further series of patients totaling over 300 has been examined and has resulted in corroboration of the above percentage statistics. There are still about 30 percent of this group of patients who have not been relieved of their discomfort and who require further analysis to determine measures necessary for their relief.

CEREBROSPINAL-FLUID STUDIES IN TEN CASES OF TOBACCO-ALCOHOL AMBLYOPIA

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Cerebrospinal-fluid analyses were made in ten cases of toxic amblyopia associated with the use of tobacco and alcohol. The total protein content of the cerebrospinal fluid tended to be elevated and in two cases it was definitely higher than normal. In both of these cases the qualititative test for protein was positive. The analyses were otherwise essentially normal. There is a significant difference between the cerebrospinal fluid findings in this disease and those which may be found in retrobulbar neuritis due to multiple sclerosis.

The author is a Fellow in Ophthalmology, Institute of Ophthalmology, Columbia-Presbyterian Medical Center. This study was carried out at the Massachusetts Eye and Ear Infirmary, in Boston. A preliminary report of this study was read before the New England Opthalmological Society, November 20, 1934.

A study has been made of the cerebrospinal-fluid findings in ten cases of toxic amblyopia associated with the use of tobacco and alcohol. The importance of such a study was made apparent when the Neurological Department at the Massachusetts General Hospital, upon examining a patient with this condition, found in an otherwise normal cerebrospinal fluid a total protein of 66 mg. per 100 c.c. The author was asked if such a change in the cerebrospinal fluid was compatible with the diagnosis and he not only did not know, but was unable to find any reference in the literature to this subject. Merritt and Fremont-Smith[1] state that the normal range in total cerebrospinal-fluid protein is from 12-45 mg. per 100 c.c. and that the average is 25 mg. per 100 c.c. (Dennis-Ayer method[2]). There is some tendency in older patients to show higher values than those in younger individuals, but any finding of over 40-50 mg. per 100 c.c. is to be regarded as definitely abnormal.

Lumbar puncture has been performed on nine other patients with tobacco-alcohol amblyopia. A short abstract of each case and a detailed report of the cerebrospinal-fluid analyses will be presented.

Review of ten cases

Case 1. A male, aged 58 years, had had failing vision for 23 months. He consumed 6 quarts of "home brew" and 1 pkg. Edgewood tobacco daily. Vision, O.U. was 20/200, with normal peripheral fields, fine vitreous opacities, and discs showing temporal pallor no. 3. (Pallor was classified no. 1, within limits of normal, to no. 4 as a maximum.) There was no foveal reflex. The macula had a slightly mottled appearance. The blood Wassermann was negative on two examinations. The patient had paralysis agitans and leucoplakia of the buccal mucous membranes. He stopped all alcohol and decreased the use of tobacco to 1 pkg. weekly. His vision 22 months after the first admission was O.D. 20/40, O.S. 20/50.

Case 2. A male, aged 53 years, had suffered decreased vision for five months. The only alcohol he had consumed in the past three years was 6 bottles of beer, but he was "smoking all the time" and used 8 oz. of Granger tobacco weekly. Vision O.D. 20/70, O.S. 20/200. The visual fields showed a typical centrocaecal scotoma. The fundi were normal. Dental X-rays were said to be normal, but the teeth showed caries and were unclean. Neurological examination was normal. When seen one month later the patient had abstained from smoking and the vision was O.D. 20/50, O.S. 20/200.

Case 3. A male, aged 58 years, had had poor vision for five months. He was consuming 12 quarts of home-made wine and 6-8 oz. of Granger or Mayo's tobacco weekly. Vision was O.D. 4/200, O.S. 3/200, with typical fields, and no. 2 pallor of the discs. The teeth were diseased. X ray examination of sinuses and skull was normal, the blood Hinton normal, neurological examination normal, but there was marked nerve deafness. Patient was seen one, two, four, and six months after the first

visit. He continued to drink 6 quarts of beer weekly and failed to improve.

Case 4. A male, aged 38 years, had noticed decreased vision for 5-6 months. He was using 12 quarts of home-made wine or beer and 17 Italian cigars ("stogies") weekly. Vision was O.D. 20/30, O.S. 20/70, with typical fields, and normal fundi. Hearing tests were normal. When the patient was seen five weeks later he was still taking 3½ quarts of wine and 7 stogies weekly and his vision was 20/30, 20/50.

Case 5. A male, aged 58 years, had had hazy vision for two months. He was drinking large amounts of alcohol and using 14 oz. of Sensible tobacco weekly. Vision was 20/70, 20/40, the fields unsatisfactory due to poor co-operation, but he showed definite central color scotoma. Three months later the vision was 20/50, 20/40. In six months, the vision had decreased to 4/200, 5/200, the temporal part of the discs showing no. 2 pallor. The blood Hinton was normal. After seven months, vision was 4/200, 4/200; after eight months, it was 6/200, 8/200, with typical fields; after nine months, the same. At ten months vision was 20/200, 8/200; at ten-and-a-half months, it was 20/100, 20/100; at eighteen months, 20/30, 20/30. The patient showed this marked improvement despite the fact that he was taking 1 quart of beer, 1 "shot of hard stuff," and 3-4 pipefulls of tobacco daily. This amount, however, was much less than he formerly had used. After twenty-three months his condition was the same; after twenty-six months, vision was 20/20, 20/20. Patient now drinks 6 quarts of beer and smokes 2 oz. of Sensible tobacco weekly.

Case 6. A male, aged 57 years, had noticed gradually decreasing vision for eight months. He was consuming 1 quart of whiskey, 3 quarts of beer, and 12 oz. of tobacco weekly. Vision was 5/200, 3/200, with typical fields, temporal pallor of the discs no. 3, and many small drusen in macula. The blood Hinton was normal. X rays showed apical absorption of several teeth. He had a combined type of deafness. Neurological examination was normal.

Case 7. A male, aged 68 years, had had poor vision for two months. He drank 2 quarts of "moonshine" and smoked 14 oz. of Mayo's tobacco weekly until vision became poor. Vision was 20/100, 5/200, with typical fields, retinal angiosclerosis no. 2, and small lenticular opacities O.S. He had nerve deafness. The blood Hinton was normal. Medical examination revealed arteriosclerosis with hypertension. X ray of heart and lungs was normal. There were multiple carious teeth and apical abscesses. Three months later the patient was using 3½ quarts of beer and 6 oz. of Mayo's tobacco weekly. The fields were typical and the vision 10/200, 12/200.

Case 8. A male, aged 50 years, with progressive loss of sight for eight months, was using one-half pint of whiskey, 2½ quarts of beer, and 5 oz. of tobacco weekly. Vision was 6/200, 1/200, with typical fields and normal fundi. The medical examination, and blood Hinton were normal. Teeth had been removed two weeks prior to admission. There was nerve deafness. Three months later the patient's vision was 1/200, 2/200, and he admitted smoking just as much as previously although he had decreased his alcoholic intake.

Case 9. A male, aged 66 years, with gradual decrease in vision for several months, had been drinking 3½ quarts of beer or wine and smoking 7 cigars weekly. Vision was 20/100, 20/70. The peripheral fields were normal. The perimetrist made no mention of using colors in the centrocaecal area. One month later the condition was the same; after nine months, vision was 3/200, 3/200; after ten months, it was 3/200, 3/200 at which time the author saw the patient. The fields were typical. After eleven months, vision was 6/200, 5/200, the neurological examination normal. There was island type of deafness. After twelve months vision was the same. The patient had not abstained. Dental examination revealed multiple apical abscesses.

Case 10. A female, aged 40 years, had had blurred vision for five years, more marked in the past year. She was consuming 4-5 cocktails, 5-6 glasses of

Table 1

REPORT OF CEREBROSPINAL-FLUID FINDINGS IN TEN CASES OF TOBACCO-ALCOHOL AMBLYOPIA

Case No.	1	2	3	4	5	6	7	8	9	10
Age	58	53	58	39	58	57	68	50	66	40
Vision R. L.	20/200; 20/200	20/50; 20/200	4/200; 3/200	20/30; 20/50	4/200; 5/200	4/200; 6/200	10/200; 12/200	1/200; 2/200	6/200; 5/200	20/20; 20/20
Use of tobacco and alcohol prior to lumbar puncture	Decreased for several months before spinal puncture	Abstinence for one month	Decreased use for several months	Decreased use for one week	No abstinence	Total abstinence for one month	Smoking the same amount; decreased use of alcohol	No abstinence	Decreased use for three weeks	Infrequently takes alcohol and tobacco
Dynamics	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Cells	6 rbc. (fresh)	–	0	5 lymphocytes	0	13 wbc.	2 wbc.	7 wbc.	1 wbc.	0
NH_4SO_4	Neg.	–	–	–	+	–	–	+	–	–
Gold Sol.	0001110000	1000000000	0100000000	4100000000	0000111000	0000110000	0000110000	0011110000	0002110000	1000000000
Wassermann	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Alcohol	Neg.	–	–	–	++				–	–
Total Protein	30	29	45	23	60	45	43	66	40	27
Cl.		725		722		725				
Sugar		59		705		487				

wine, and 2-3 cigarettes weekly. Vision was 20/20, 20/20. There was a large centrocaecal scotoma which extended almost to the point of fixation. Both discs showed no. 4 temporal pallor. Neurological, blood Wassermann, X ray of sella turcica, and medical examinations were normal. The patient had had a bullet in the thigh for several years, but the X ray showed no evidence of lead in the bones, the blood cells no stippling, and a spectographic blood analysis was negative. After three months the condition was the same, as it was also after four months.

Table 1 indicates the cerebrospinal-fluid findings in each of the cases. It is apparent that they are essentially normal except that the total protein content tends to be elevated. The average total protein in these cases is 40.8 mg. per 100 c.c., whereas the average in normal persons is considered to be about 25 mg. The highest protein findings, i.e., 60 and 66 mg., which were definitely pathological, were in patients whose cerebrospinal fluid was examined before they had decreased their intake of tobacco and alcohol. This elevation of the protein content cannot be attributed to acute alcoholism because none of these patients showed any evidence of intoxication at the time of the examination and furthermore, Merritt and Fremont-Smith, in a cerebrospinal-fluid study[1] of 107 cases of acute alcoholism, found that "the protein content of the fluid is practically always normal." Table 1 also shows that there was no relation between the age of the patient and the cerebrospinal-fluid findings. It is, however, interesting to note, although perhaps only a coincidence, that the patients with the highest cerebrospinal-fluid protein content also had the poorest vision.

The difference between the cerebrospinal-fluid findings in these cases and those in retrobulbar neuritis due to multiple sclerosis perhaps needs no mention. The cerebrospinal fluid may show no change, or the changes may be identical in these two conditions. However, in multiple sclerosis, while there are no pathognomonic cerebrospinal-fluid changes, abnormalities in the colloidal gold reaction are very frequent. When, in a clinically suspicious case, a paretic type of gold solution accompanied by a negative Wassermann test and sometimes a slightly increased cell count and elevated protein content is discovered, the findings strongly support the diagnosis of multiple sclerosis, not tobacco-alcohol amblyopia.

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References

[1] Merritt, H. H., and Fremont-Smith, F. The cerebrospinal fluid. Nelson Medicine, 1934, pp. 551-555Z.

[2] Ayer, J. B., Dailey, M. E., and Fremont-Smith, F. Denis-Ayer method for quantitative estimation of protein in cerebrospinal fluid. Arch. Neurol. and Psychiat., 1931, v. 16, p. 1038.

THE RETICULUM IN THE CHRONICALLY HYPERPLASTIC CONJUNCTIVA

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In an attempt to obtain some histologic differentiating sign between trachoma and other hyperplastic conditions of the conjunctiva, this staining of the reticular fibers was undertaken. The majority of the specimens thus investigated were those of trachoma. The results were fairly uniform. From the Pathological Laboratories of the Oscar Johnson Institute, Washington University School of Medicine, St. Louis. The entire work was done under a grant from the Commonwealth Fund of New York City.

It is proposed to report in the present communication the results of a study on the prevalence and character of the reticular fibers in the lymphoid tissue of the conjunctiva in trachoma and other chronic hyperplastic processes.

Maximow[1] doubts that reticular fibers actually represent a special type of connective tissue. He believes that they are probably a form of collagenous fibrils and may therefore occur in any type of connective tissue. The first fibers to appear when collagenous tissue is formed in the embryo or in the adult body are the reticular networks; these are gradually transformed into collagenous bundles. The idea of the immature nature of the reticular fibers agrees well with the fact that they are usually found in such places of the connective tissue where undifferentiated cells of mesenchymal nature are assembled (lymphoid and myeloid tissues, as well as outside the walls of the capillaries). The methods generally used for the demonstration of collagenous fibers do not stain the reticular fibers distinctly. They are selectively impregnable with silver, however, after which they appear as black, sharply drawn nets on a yellow or brown background. This characteristic gives reticulum the name of argyrophil fibers.

In a classification of the chronic hyperplastic disorders of the conjunctiva, Pascheff[2, 3] concludes that true trachoma is characterized by an intensive differentiation of the lymphadenoidal tissue with the formation of confluent germinal centers. Taborisky[4] in an exhaustive study of recent date on the histology of early trachoma, states that the development of follicles in the conjunctiva in trachoma corresponds entirely with the findings of Ribbert on the regeneration of the lymphatic glands. According to him, the most important function of the follicle is the new formation of lymphocytes. Peters[5], in 1932, was led to believe from his observations on the trachomatous conjunctiva, that the reticular fibers possibly promote the process of cicatrization in trachoma, just as occurs in the sclerotic processes of the lymphatic glands and of the liver.

Therefore, since the follicles in the conjunctiva in trachoma or in any follicular disorder are true lymph follicles with secondary nodules or germinal centers, it is to be expected that they would contain reticulum.

In fact, using Foot's rapid method of silver impregnation, Beigelman[6] reports his studies on the character of reticulum in folliculoses of the conjunctiva, vernal catarrh, and Parinaud's conjunctivitis. In folliculosis of the conjunctiva, he finds reticular fibers in the follicle proper in considerable numbers and consequently discernible even under low magnification. The author is unable to report on the application of this stain in trachoma because of the scarcity of available early trachoma. The object of his paper is to call to the attention of American ophthalmologists the technique of staining reticular fibers with its application in chronic hyperplastic diseases of the conjunctiva.

Needless to say, the value of this impregnation with silver of the reticular fibers would be of tremendous value if it would enable the histologist to differentiate accurately between early trachoma and other follicular conjunctivitides.

In the present report, tissue from the

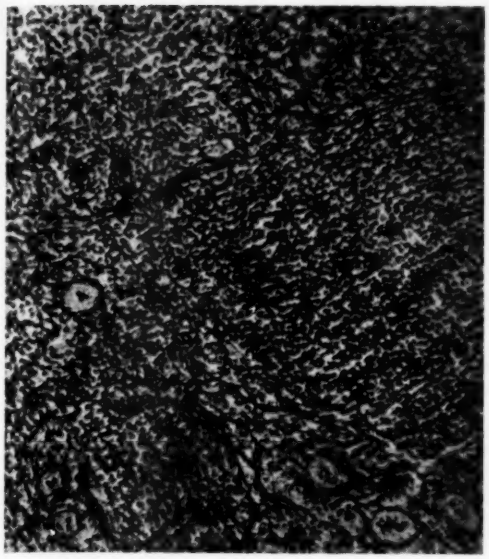

Fig. 1 (Lamb). Section through part of a trachomatous caruncle, showing fibers of reticulum around a follicle but none in half of a germinal center of a follicle on the right (Case 1227).

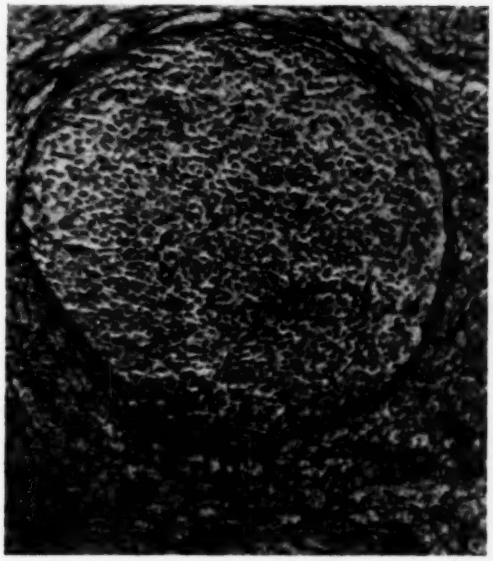

Fig. 2 (Lamb). Section through part of a trachomatous caruncle, showing networks of reticulum around a germinal center but very few anywhere in the germinal center (Case 1258).

Fig. 3 (Lamb). Section through corneal conjunctival tissue in pemphigus, showing reticular threads between the dense chronic inflammatory cells and the lighter-colored, new-formed cicatricial tissue (Case 1162).

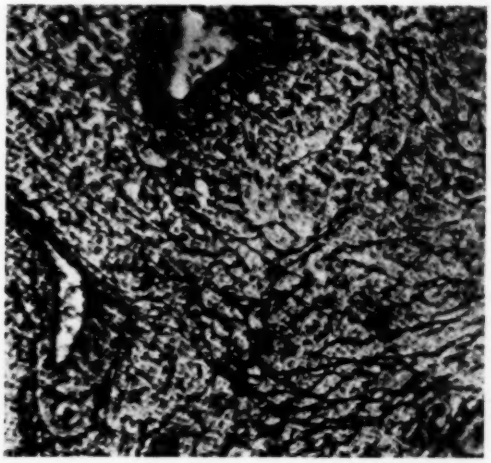

Fig. 4 (Lamb). Section through palpebral conjunctiva, affected in chronic lymphatic leukemia, showing networks of reticulum around epithelial downgrowths and between the small lymphocytes (Case 643).

conjunctiva of the eyelid or fornix is studied in four cases of certain trachoma and in two cases of chronic follicular conjunctivitis in adults. Three specimens of conjunctiva came from caruncles affected with trachoma, one specimen was taken from a trachomatous pannus, one from the bulbar conjunctiva with a follicular reaction due to allergy, one from the cornea in pemphigus, and the last, or thirteenth, from the palpebral conjunctiva in chronic lymphatic leukemia. In all the cases, the process involved both eyes with the

exception of the case with trachomatous pannus.

The method of silver staining used here for reticulum has been described lately by Foot and Foot[7]. One is particularly impressed with the value of this technique after using other methods of coloring reticulum. This procedure avoids entirely the disadvantage of the others in having the paraffin film loosen and float away in the warm silver solution. The bluish-black colored reticulum is sharply differentiated from the remainder of the tissues in the section, which therefore needs no counterstain to show the relation of the reticulum to the surrounding structures. For purposes of comparison, sections from many of the specimens in the present study were also colored with Mallory's aniline-blue stain for collagenous fibers. Of course, in the case of all the specimens, sections stained with hematoxylin-eosin have been studied as well.

Six of the eight specimens from patients with trachoma were received from the United States Public Health Service Hospital for Trachoma at Rolla, Mo., through the courtesy of Dr. C. E. Rice.

Trachoma

Conjunctiva of eyelid and fornix. Case 463. A piece of the conjunctiva was excised from the superior fornix of an Indian schoolgirl with trachoma, at Albuquerque, New Mexico. Microscopically, it contained many follicles of large size with an intervening dense infiltration with small round cells (small lymphocytes and plasma cells).

Very little reticulum was present in the large germinal centers of the follicles; only between the round cells in the thin peripheral wall of the follicles was there observed generally a fine-meshed network of reticulum. Only a small part of the reticular networks in this specimen stained by Mallory's aniline-blue method. Although there was but a meager history in this case, it seems certain from the microscopic findings, that the trachoma had not been present more than six months.

Case 781. From a patient with trachoma of fifteen years' standing, the tarsus of the upper eyelid with its covering conjunctiva was excised. This conjunctiva was very much thickened by a dense diffuse infiltration with small round cells; many tubular downgrowths from the surface epithelium were observed, extending deeply into this swollen conjunctiva.

A large number of thick and thin branching trabeculae and networks of reticular fibers lay irregularly scattered among the round cells and closely surrounding the buried tubules of epithelium. Only short lengths of a reticular lamella appeared in a few places just under the surface epithelium. The amount of reticulum was not generally greater near the tarsus than elsewhere in the conjunctiva. New-formed connective tissue in the infiltrated conjunctiva was more common near the tarsal connective tissue. All except the finer reticular fibers colored by Mallory's aniline-blue procedure. This method differentiated particularly well the reticular fibers surrounding the buried tubules of epithelium. The active trachomatous process had been of long standing in this case.

Case 1095-1. A man, 26 years old, with an active follicular trachoma and pannus, had been affected with the disease for ten months at the time the specimen was excised.

Case 1096. A boy, 7 years old, had suffered for one year with ocular inflammation. In addition to a follicular trachoma and pannus, an ectropion of both lower eyelids was present.

From an upper eyelid in the first case and from a lower eyelid in the second, the tarsus with its covering conjunctiva was excised. In the first case, a layer of cicatricial tissue, in some places as thick as the tarsus itself, had been laid down on the inner surface of the tarsus. Internal to this cicatricial layer, there was observed a comparatively thin layer of edematous conjunctival tissue, containing a small number of small lymphocytes and plasma cells, and showing a moderate degree of hyperplasia of the surface epithelium with a few short downgrowths. In the second case, a definite layer of new-formed connective tissue was not present, but

the considerably thickened and edematous conjunctiva on the tarsus contained a small quantity of small round cells with many solid and tubular epithelial downgrowths of greatly varying lengths.

The amount and arrangement of the reticular fibers in the edematous parts of the conjunctivae were about the same in both specimens. A considerable number of networks of reticulum were observed. In both instances, a well-developed, thick lamella of reticulum lay everywhere just under the surface epithelium. This lamella could be seen under high magnification to be composed of several fine reticular fibers and was continuous with a similar lamella and networks of reticulum closely surrounding all the epithelial downgrowths. In the first case, the connection of the reticular fibers with the underlying cicatricial tissue was not close; at least, the reticular networks were generally diffusely scattered through the edematous conjunctiva. Mallory's aniline-blue colored only a very small part of the coarser reticular fibers in the first case, whereas in the second, the same stain affected all but the finer fibers of the reticulum. Accordingly in the second case, a combination of Verhoeff's elastic tissue and Van Gieson's stains was used; it brought out practically none of the reticular fibers. In the second case, the new formation of connective tissue was observed deep to the conjunctival surface and principally near the tarsus.

Conjunctiva of the caruncle. Case 1227 (fig. 1). A girl, 12 years old, had complained of ocular symptoms for one year. The eyes presented follicular trachoma and pannus.

Case 1230. In a girl, 16 years old, the eye trouble dated back ten weeks. Follicular trachoma and incipient pannus were observed.

In both cases, the excised pieces of tissue from a caruncle showed large follicles, between which there was a dense infiltration of small round cells.

The reticulum over the large germinal centers of the follicles was scanty, whereas networks of it were common between the small round cells in the periphery of the follicles and in the dense cellular infiltration between the follicles. In both cases, a thin lamella of reticulum was present in many places but not everywhere under the surface epithelium. As would be expected, the amount and thickness of the reticular fibers were less in the second case. Only a small part of the coarser reticular fibers colored by Mallory's aniline-blue in either specimen.

Case 1258 (fig. 2). Trachoma had been present for many years in a man, 40 years old. There was observed a follicular and papillary conjunctival process with much cicatrization and pannus. Conjunctiva from both caruncles in this patient was excised.

The excised conjunctivae were generally edematous and infiltrated from a moderate to an intensive degree with small round cells. In the midst of a very thick layer of this cellular infiltration, a large germinal center was observed.

A considerable amount of reticulum was present in the thickened conjunctiva between the small round cells; only a very few reticular fibers were present between the epithelioid cells in the germinal center. A thick reticular lamella was everywhere observed just under the covering epithelium. Many of the coarser reticular fibers took Mallory's aniline-blue stain.

Pannus. Case 1149. A man, 37 years old, had suffered for seven years with a unilateral trachoma in the left eye. A pannus crassus developed over the superior half of the cornea and resisted all treatment.

Microscopic examination of the enucleated eye showed the cornea to be everywhere covered by a pannus which in the upper half of the cornea involved from one half to two thirds of the corneal thickness. The infiltration with small round cells was very dense throughout the pannus.

Many reticular fibers were present in the tissue of the pannus, particularly in its deeper-lying portions.

Chronic Follicular Conjunctivitis

Conjunctiva of the fornix. Case 332. A woman, 58 years old, suffering with general arteriosclerosis and cardiac hy-

pertrophy had recently developed a thickening of the palpebral conjunctiva and numerous fine follicles and in the fornices, an hypertrophy of the adenoid layer and many large soft follicles. A few blood vessels were present superiorly in the cornea. After grattage of the eyelids and fornices, follicles returned in a moderate degree over the tarsi.

The excised piece of tissue from the fornix of an upper eyelid presented large follicles with an intervening dense infiltration of small round cells.

Numerous networks of reticulum were present between the small round cells in the periphery of and between the follicles, and a moderate number of branching reticular fibers were observed in the germinal centers. A fine reticular lamella just under the surface epithelium was observed only in spots.

Case 1172. A woman, 64 years old, while in Barnes Hospital for arteriosclerosis, hypertension, arteriosclerotic cardiac disease, and an arteriovenous aneurysm of the right orbit developed a considerable thickening of the conjunctiva over the tarsi and in the fornices. Cultures from the conjunctival secretion were negative for microorganisms and scrapings from the thickened conjunctiva were negative for inclusion bodies. The specimen of conjunctiva excised was taken from the superior fornix.

Microscopically, the sections from this specimen showed the conjunctiva to be considerably thickened by a diffuse, dense infiltration with small round cells, in the midst of which were large germinal centers.

The reticular fibers were numerous and generally thick among the infiltrating cells except in the germinal centers of the follicles. Mallory's aniline-blue colored many of these reticular trabeculae.

Allergic Reaction

Bulbar conjunctiva. Case 1264. A man, 57 years old, a patient of Dr. Meyer Wiener, gave a history of hayfever attacks occurring over the previous ten years, lasting each year from June until the first frost in the fall. In October, 1933, he entered Barnes Hospital with all the conjunctivae inflamed and numerous small follicles in the bulbar conjunctiva near the cornea. The nasal mucous membranes were injected and boggy; smears from the nasal secretion showed many large round cells and eosinophiles.

A small piece of the bulbar conjunctiva containing follicles was excised. Microscopically, the conjunctiva showed, besides large follicles, an intervening moderately dense infiltration with small round cells.

A large number of reticular networks were present in the periphery of the follicles and in the cellular infiltration between the follicles. A well-developed lamella of reticulum was present everywhere just beneath the surface epithelium.

Pemphigus

Cornea. This case was reported in detail by Drs. R. C. Smith, E. A. Myers, and H. D. Lamb and published in the Archives of Ophthalmology, 1934, v. 11, p. 635.

Case 1162 (fig. 3). In a 61-year-old woman, pemphigus had been present for 14 months with manifestations in the mouth, pharynx, and both eyes.

The right eyeball, enucleated because of intense pain, presented the characteristic chronic inflammatory process in the bulbar conjunctiva, extending for a considerable distance onto the periphery of the cornea; much new-formed connective tissue was observed lying deeply between the infiltrating small round cells.

A very large number of reticular fibers, diffusely scattered among the round cells, were not generally more numerous in the deeper parts but were nevertheless directly continuous with the new-formed connective tissue.

The pannus of trachoma, therefore, is not entirely dissimilar to the corneal invasion in pemphigus. In both, the blood vessels and small round cells come from the adjoining bulbar conjunctiva. As in all chronic inflammations of the eyeball, so in trachoma and pemphigus, the peripheral portions of the cornea, gradually become more extensively

changed, superficially, to tissue resembling chronically inflamed bulbar conjunctiva. It gives the appearance of an extension of the inflamed bulbar conjunctiva onto the anterior surface of the cornea peripherally.

Chronic Lymphatic Leukemia

Palpebral conjunctiva. Case 643 (fig. 4). A man, 56 years old, in Barnes Hospital with chronic lymphatic leukemia showed leukemic nodules in the skin and leukemic changes in the palpebral conjunctivae, particularly of the upper eyelids. The latter consisted clinically of a thickening, a fine papillary hypertrophy and petechial hemorrhages in the conjunctiva.

A biopsy from the affected palpebral conjunctiva of the right upper eyelid presented considerable thickening of the conjunctiva with dense numbers of small lymphocytes, in the midst of which were many long tubular downgrowths from the surface epithelium.

The networks of reticular fibers were very frequent in the infiltrated conjunctiva. In this case, the reticulum increased in quantity in the deeper parts of the conjunctiva and presented a direct continuity with the underlying connective tissue of the tarsus. Just under the surface epithelium, there was everywhere observable a thick lamella of reticulum; the latter was continuous with a similar lamella or reticular network closely surrounding the epithelial downgrowths.

Summary and Conclusions

As regards reticulum, the observations on its prevalence and character in the cases reported, with the exception of those involving the cornea, were fairly uniform. There was generally present a lamella composed of fine reticular fibers lying immediately under the surface epithelium. This lamella of reticulum was always continuous with a similar lamella or reticular network, closely surrounding any epithelial downgrowths. Follicles always showed a reticular network between the small round cells in the periphery; the germinal center of the follicles contained comparatively few reticular fibers. Lastly, the reticulum was generally well developed between the small round cells lying between the follicles or infiltrating the conjunctiva in the absence of follicles. The longer the duration of the conjunctival process, the more developed was the reticulum, as might be anticipated. In contrasting the results of this study in which observations were made on essentially trachomatous tissues, with those of Beigelman[6], made essentially on folliculosis, it can hardly be disputed that the amount and arrangement of the reticulum is more or less similar in the two conditions. It is therefore difficult to see how the demonstration of reticulum in the hyperplastic conjunctiva offers any assistance in the diagnosis of early trachoma.

Although but one case was available, it is not without significance that the findings in the palpebral conjunctiva of chronic lymphatic leukemia so much resembled those in trachoma, in that both exhibited a similar composition of reticulum and numerous long epithelial downgrowths.

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A CRITIQUE OF GLAUCOMA OPERATIONS

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Glaucoma is defined and divided into categories not referable to the intraocular tension. The types of operations best suited to the various kinds of glaucoma are discussed. A palliative for absolute painful glaucoma is suggested; namely, diathermy coagulation of the vitreous. Read before the Brooklyn Ophthalmological Society, December 20, 1934.

Before discussing the surgery of glaucoma, it is essential that we know what disease we are talking about. The term glaucoma means nothing more than a collection of conditions that have in common the one phase of intraocular pressure that is elevated above the normal for the eye under consideration. So-called normal tension cannot be given a numerical value but can be defined as that degree of intraocular pressure that the tissues of the eye are able to withstand without damage to function. Consequently a classification of glaucoma in which pressure values are given predominance is entirely invalid. In the light of our present very inadequate knowledge of the subject, probably the best classification of glaucoma is as follows:

I. Primary glaucoma
   A. Acute incompensated or inflammatory.
   B. Chronic incompensated or inflammatory.
   C. Compensated or simplex or noninflammatory.
   D. Infantile.
II. Secondary glaucoma.
III. Absolute glaucoma.

Such a classification covers all known forms of the disease and permits of a critique of glaucoma surgery according to the form of the disease in which a specific operation is employed.

In view of our very inadequate knowledge of the causative factors of glaucoma and of the intricate mechanism that causes the functional destruction, it is obviously impossible to endeavor to eliminate the underlying morbid factors and our endeavors are directed toward remedying the one condition concerning which we have positive knowledge and whose destructive effects are well recognized; namely, increased intraocular pressure. Consequently, it is the aim of all glaucoma surgery to reduce the tension to a range that is normal for the eye in question. To that end, whatever operative procedure is employed falls into one or more of the following classes:

I. Operations to restore the normal intraocular paths of drainage.

II. Operations to open new intraocular paths of drainage.

III. Operations to form paths for extraocular drainage.

With these classifications before us, it now becomes possible to discuss the present-day operative procedures, their indications and contraindications, and their chances for success, always taking into consideration the form of glaucoma in which the operation is employed.

The aqueous is the fine balance wheel of intraocular pressure in that minor variations are compensated for by this fluid, and any interference with the formation or outflow of the aqueous tends to upset the balance. Interference with the formation results in a decrease in intraocular pressure and consequently plays no role here, inasmuch as we are powerless to influence it. The outflow or drainage takes place to the greatest extent through the canal of Schlemm, although there seems to be no doubt but that there is some elimination of aqueous by absorption from the crypts of the anterior surface of the iris. That phase, however, is so comparatively small that it plays no role in the surgical consideration of the relief of increased intraocular pressure. Consequently, our entire attention must be directed toward the outflow that occurs through the canal of Schlemm. Blockage of the canal of Schlemm is but a figure of speech, for it is not the canal that is blocked, but rather the spaces in

the interstices of the ligamentum pectinatum. Thus the fluid cannot gain access to the mouths of the canal. This blockage is due to compression of the ligament by pressure of the iris from behind, by swelling in the fibers of the ligament that may participate in the general edematous process, and by actual closure of the space due to contact between the anterior surface of the iris and the posterior surface of the cornea. Consequently, to open the canal of Schlemm it is necessary to free the atrium, and the function of the canal will be reëstablished automatically.

In operations of the first type, the endeavor is to open the spaces leading to the canal of Schlemm. Iridectomy and its various modifications is the main example of this type and will serve to illustrate the why and wherefore. A properly executed iridectomy, no matter whether performed with a keratome or with a Graefe knife or with a scalpel *ab externo*, must remove the root of the iris sufficiently peripherally so that posterior pressure cannot find any iris tissue to jam into the chamber angle. That is possible only if fibrous adhesions have not yet been formed between the peripheral anterior surface of the iris and the posterior surface of the cornea. When such adhesions are present, no iridectomy, no matter how beautifully executed, can possibly restore the normal intraocular drainage, and if it should be successful the result is due to the formation of a fistulous scar or extraocular drainage.

As a result, the indications for iridectomy are somewhat more limited than is popularly believed. In acute incompensated glaucoma, the fulminating form, firm anterior adhesions are formed within forty-eight to seventy-two hours of the onset of the attack, and consequently, the earlier the iridectomy is performed, the greater are the chances for restoration of normal intraocular drainage. Every day over three that the attack lasts lessens the chances of success of a Type I operation and increases the indications for a Type III operation. It must be added that a complete iridectomy involving the sphincter portion of the iris and resulting in a large coloboma is not necessary to restore intraocular drainage and is indicated only in the presence of definite corneal or lens opacities. Excision of the peripheral portion of the iris accomplishes the result satisfactorily and leaves the eye in a far better functional condition as a visual organ than does a complete iridectomy. Furthermore, excision of a broad peripheral amount of the iris is unnecessary. A well-placed peripheric coloboma, twenty-five to thirty-five degrees in width, accomplishes just as much as does a wider excision.

In other forms of glaucoma, a Type I operation is futile with but two exceptions. One meets occasionally with a simple compensated glaucoma in which there is an abnormally deep anterior chamber, despite an intraocular pressure that is above the normal for that eye. In such cases, iridectomy is apt to be successful in the normalization of tension. In secondary glaucoma that has failed to yield to medicinal therapy, Type I operation is indicated when the anterior chamber is not too shallow. But if the iris is lying close to the posterior surface of the cornea and remains there in spite of adrenalin therapy and even posterior sclerotomy, then a Type III operation offers greater chances of success than does a Type I.

The only operation under Type II that comes into consideration is cyclodialysis. When this was first proposed by Heine, in 1907, he advanced the theory that the *modus operandi* of the operation was the opening of a path between the anterior chamber and the suprachoroidal spaces whence the aqueous could be absorbed into the blood stream. This view was regarded with some scepticism and there were many adherents of the idea that the success of a cyclodialysis resulted from severing the trophic nerves to the ciliary body with subsequent decrease in the formation of aqueous. But within the past two years, the anatomical examination by Elschnig of an eye upon which a successful cyclodialysis had been performed some ten years previously and which was obtained at autopsy, showed a definite pathway be-

tween the anterior chamber and the suprachoroidal spaces, thus confirming the original view expounded by Heine.

In his first publication, Heine stated that "The more urgent the indications for operation, the less successful will be the results of cyclodialysis." That pronouncement still holds true. Cyclodialysis is not and never can be a cure for increased intraocular tension, except in unusual cases; it is, however, a valuable adjunct to the miotic treatment of compensated glaucoma when the operative indications are strictly observed. In cases of compensated glaucoma that are just beyond the control of miotics, in chronic incompensated glaucoma in which iridectomy has just barely failed of success, and in hypertension that at times occurs following a successful extraction of the lens, cyclodialysis does yeoman service, particularly if followed by miotics. But when the operation is resorted to in cases in which the indications are for iridectomy or for a Type III operation, cyclodialysis is not apt to be successful. It was the disregard of such indications that brought the operation into disrepute early in its career in this country.

The failure of cyclodialysis in cases of acute hypertension or of chronic excessive hypertension can be understood easily. The success depends upon the establishment of a drainage pathway between the anterior chamber and the suprachoroidal spaces, where only a limited amount of aqueous can be absorbed into the blood stream. Even though the chamber be emptied at the time of operation, there is no large drainage that can be relied upon to keep the pathway open and take care of the excessive hypertension until the new pathway becomes a permanent affair. Consequently the suprachoroidal space is called upon to drain away more fluid than it is capable of doing; the intraocular tension increases fairly rapidly; and in consequence, the pressure upon the inner aspect of the ciliary body pushes it against the sclera until the newly opened pathway is completely obliterated.

But if the indications are followed carefully, cyclodialysis yields a high percentage of successes. There are several technical steps that must be observed, however. The main one is to free a sufficiently large area of the periphery of the chamber angle; at least one third of the entire circumference must be included in the lateral sweeps of the spatula. Furthermore, the spatula must separate the ciliary body from the sclera posterior to the incision. Only too often does the operator endeavor merely to free the chamber angle, which alone is not sufficient. A path to the suprachoroidal space must be opened. It stands to reason that hemorrhage into the anterior chamber is bound to occur upon severance of the anterior ciliary vessels. If this bleeding does not take place, it is usually evidence that the backward sweep of the spatula was not sufficiently extensive. In consequence of the hemorrhage, the use of a mydriatic after operation is essential for one to three days or until the blood is absorbed. Otherwise, disastrous posterior adhesions will follow.

From clinical experience we know that a Type II operation is of no value in congenital or absolute glaucoma. In secondary glaucoma it is of doubtful value except when occurring in an aphakic eye. Type II operation is definitely contraindicated in acute incompensated glaucoma and should be used in chronic compensated glaucoma only secondary to an iridectomy. In certain cases of compensated glaucoma, when the indications are that a simple cyclodialysis would not be successful, an iridectomy followed one to three weeks later by a cyclodialysis is apt to be of enormous value. But the strict indications for a Type II operation are those of compensated glaucoma that is just beyond the control of miotics.

Theoretically, the third type of operation should be indicated only in such cases in which there is no hope of restoring normal drainage through the chamber angle or in which the condition is so severe that it would be futile to endeavor to open a drainage path into the suprachoroidal spaces. But inasmuch as it is impossible to determine clinically with accuracy whether or not such conditions exist, operations of the third type have a wider clinical than

theoretical range of practicability. Historically the fistulizing operations appeared as follows:

1. Coccius—1859. Iridectomy with iris inclusion.
2. Argyll Robertson—1876. Trephining of the sclera.
3. Bader—1881. Iris inclusion into scleral incision.
4. Herbert—1903. Iridosclerectomy.
5. Lagrange—1905. Iridosclerectomy.
6. Holth—1906. Iridencleisis.
7. Borthen—1909. Iridotasis.
8. Elliot—1909. Corneoscleral trephining.

This does not take into account the aqueoplasty type of operation of Mayou, Zorab, or Prince, all of which have been abandoned.

The surgical survivors of the formidable list of Type III operations seem to be Elliot's trephining, Herbert's sclerectomy, Lagrange's iridosclerectomy, Holth's iridencleisis, and Borthen's iridotasis. Peculiarly enough, every operator of any great experience favors some one of these operations, practically to the exclusion of all others, but is unable to give valid reasons for his preference. As was previously stated, statistics concerning end results from operations for hypertension cannot be absolutely accurate and it would seem that the choice of Type III operation by the individual operator depended upon his familiarity with the operation, upon his dexterity in performing it, and upon the end results he obtained. From the figures that have been published from the various large clinics, there does not seem to be any great choice in favor of any one of the five surviving operations.

Every successful fistulizing operation depends upon: (a) the formation of a fistulous tract that connects the anterior chamber with the subconjunctival space; (b) the permanence of that fistula which can be insured only by the inclusion of a piece of pigmented iris epithelium; (c) the spreading out of the aqueous under a fairly large area of conjunctiva with the development of a bleb; and (d) the filtration of aqueous from the subconjunctival space through minute practically physiological fistulae in the conjunctiva, thus connecting the subconjunctival aqueous reservoir with the open conjunctival sac.

It does not seem to make any great difference as to how this fistula is produced, whether with a keratome, a trephine, or a scleral punch. Nor does it seem to make any great difference what the exact location of the fistula is, provided only that the interior end is so placed as to be freely accessible for the aqueous and that the external end opens freely into the subconjunctival space. But the step that establishes the permanence of the fistula is of vital import. To insure a continuous drainage through the mesodermal corneoscleral tissue, a foreign tissue must be implanted. Consequently, the anterior leaf of the iris is not sufficient, for this is also mesodermal and it is of utmost consequence that a bit of ectoderm in the form of posterior pigment epithelium of the iris be not only drawn into the wound, but be so left that it remains there. I believe that the majority of failures among fistulizing operations is due to the retraction of iris pigment from the fistula.

A large conjunctival bleb is more apt to be associated with a successful result than is a small one. It stands to reason that the aqueous must have a relatively large area under the conjunctiva to accommodate for fluctuations in intraocular pressure. It is believed that the success of filtration by a fistulizing operation depends upon the ultimate filtration of the aqueous onto the free surface of the conjunctival sac. The almost uniformly positive results of the uranin test confirm this view, although it must be said that at times no clinical evidences of surface filtration can be found.

Granted that this is the case, the main objection to a fistulizing operation can be understood easily. Late infection is the great bugbear of this type of operation. Again it is impossible to estimate the frequency of occurrence of late infection for the same reasons that were previously stated. According to different authors, late infection occurs in anywhere from one to ten percent of all fistulizing operations, but no one knows accurately. Certain it is that this

danger exists continuously in every fistulizing operation and persists as long as the fistula is patent, even unto the lifetime of the patient. As a result, one is scarcely justified in performing this operation upon a younger patient, thus exposing the eye to continuous danger, provided an equally successful result can be obtained by an operation of another type that is not imperiled by this "sword of Damocles."

The indications for the use of operations of the third type are rather broad. In acute incompensated glaucoma in an early stage, a fistulizing operation offers no greater chances for success than does a skillfully performed iridectomy. But in the later stages and in the chronic forms, the Type III operation comes into its own. Compensated glaucoma in the early stages does not require operative interference so drastic as a fistulizing operation, but in the later stages no other form of surgery offers the same chances of success as does a Type III operation. In absolute glaucoma, any operation is doomed to failure. In juvenile glaucoma, better results have followed fistulizing operations than any other form of surgery. When secondary glaucoma is due to intraocular inflammation such as uveitis, a corneoscleral fistula is apt to become plugged by exudate or to fill up by connective-tissue proliferation, regardless of the implantation of pigmented iris epithelium, and consequently, in such cases, operations of the first or second type are more apt to be successful.

All this can be condensed into a table as follows:

In conclusion, I wish to offer to you a new procedure for use in absolute painful glaucoma; namely, diathermy coagulation of the vitreous. In the later stages of absolute glaucoma, the eye becomes very painful, partially on account of the pressure and partially on account of the breaking down of corneal bullae. None of the operations that I have spoken of are of any value in this condition and one must resort to enucleation. Some two years ago, a physician's mother presented herself for advice regarding a painful eye due to absolute glaucoma. She was suffering from a severe heart lesion that precluded the use of a general anesthesia and her medical adviser feared that the shock of enucleation under local anesthesia would be fatal. So I suggested the following procedure which was carried out: (a) cocaine-epinephrin instillations; (b) subconjunctival injection of some 5 minims of 1-percent novocaine in the lower outer quadrant; (c) introduction of a thin steel needle, such as is used in the Weve operation for detachment of the retina, through the conjunctiva and sclera in the lower outer quadrant of the eyeball, about 14-16 mm. from the limbus, pointing directly toward the center of the vitreous. Under 60-75 milliamperes of coagulating current, the needle was introduced some 12-14 mm. into the vitreous and allowed to remain there with current for two minutes; (d) needle removed with one rapid pull.

The procedure was entirely painless and was followed by very little reaction. No bandage was used. Within a few minutes, the intraocular tension

	Acute Incompensated		Chronic Incompensated	Compensated		Juvenile	Secondary	Absolute
	Early	Late		Early	Late			
Type I	+	∓	−	−	−	−	±	−
Type II	−	−	−	+	−	−	∓	−
Type III	+	±	+	±	+	+	∓	−

\+ Indicates that the chances of success are good.
− Indicates that this type of operation is contraindicated here.
± Indicates that this type of operation probably will be successful, but possibly may not.
∓ Indicates that this type possibly may be successful, but probably will not.

had sunk to normal and remained at that level for about twenty-four hours. The pain disappeared entirely. Gradually the tension began to rise and within thirty days had risen to between 60 and 70 mm. Hg, where it has remained ever since. But during all this time, there has been no recurrence of pain, the eyeball has been pale, and there has been no further bullous keratitis. Inasmuch as the lens was opaque it was impossible to see what occurred within the eyeball.

I have carried out this procedure upon five other patients with painful absolute glaucoma and have observed them from three to twenty months subsequently. In no case was there a recurrence of pain, but in no case was the tension normalized for more than a short time. I am unable to explain the *modus operandi* of this procedure and offer it to you for what it is worth, based purely upon clinical experience.

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UVEOPAROTID TUBERCULOSIS

Report of Two Cases

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This is a syndrome of rare occurrence, commonly known as uveoparotid fever. Bilateral enlargement of the parotid gland together with chronic uveitis is the essential feature. The ocular inflammation presents the typical picture of chronic tuberculous iridocyclitis. In one of the two cases here reported there was persistent uveitis and mediastinal adenitis. Biopsy of an enlarged supraclavicular lymph node revealed a tuberculous lesion, the histologic features of which conformed exactly to those described in biopsies of the parotid gland and iris in previously reported cases. From the Department of Ophthalmology, Jewish Hospital of Brooklyn.

The association of chronic bilateral uveitis with enlargement of the parotid glands accompanied by a variable group of symptoms forms a syndrome first recognized by Heerfordt[1] in 1909, and variously described in the literature as Uveo-parotitis, Uveo-parotid Fever, Uveo-parotitic Paralysis, and most recently Uveo-parotid Tuberculosis. The condition is rare. A total of sixty-four cases has been reported, five in the United States.

In 1932, Garland and Thomson[2] reviewed forty-seven cases collected from the literature including one of their own. While either sex may be affected, the predilection is for females. The majority of cases occur in the second and third decades of life. There may be a premonitory period lasting from a few days to several months, characterized by such symptoms as malaise, lassitude, drowsiness, gastro-intestinal complaints, skin rashes—particularly erythema nodosum, cough, night sweats, joint pains, and puffiness of the eyelids. A bilateral uveitis appears, preceded or followed by or simultaneous with enlargement of both parotid glands. The parotid swellings are firm, nodular, generally painless, occasionally slightly tender, and often confined to the pre-auricular area, or they may extend below the jaw. They never suppurate and usually subside within a few weeks or months. The ocular inflammation presents almost invariably the typical picture of chronic tuberculous iridocyclitis[3], varying only in degree of severity, and characterized by the absence of marked ciliary injection or pain, unless glaucoma is a complication, by keratitis punctata, turbidity of the aqueous, posterior synechiae, Koeppe nodules, vitreous opacities, and a protracted course varying from several months to a few years. A unilateral or bilateral facial paralysis and slight pyrexia are the most frequent accompanying symptoms. A variety of others

have been noted in a small number or isolated cases, such as other signs of nervous-system involvement, enlargement of the lacrimal glands, generalized adenopathy, various skin eruptions, splenomegaly, dry mouth, polyuria, and joint pains. Recovery of general health with persistence of ocular inflammation is the rule. Three of the reported cases ended in death, and in each necropsy disclosed a widespread miliary tuberculosis as the cause. Blood study does not show a characteristic picture.

The age and sex incidence, the order and duration of the symptoms, the character and site of the parotid enlargements, the absence of any contagion from these cases, the temperature and blood counts serve to set off this entity as distinct from epidemic parotitis.

Garland and Thomson strongly uphold the view long accepted by many Continental authors[4] that this syndrome represents an atypical manifestation of tuberculous infection and suggest Uveo-parotid Tuberculosis as the most appropriate designation for it. They found that in one third of the cases there was incontrovertible, and in many others suggestive evidence of tuberculosis. Particularly significant is the fact that two of the three patients who succumbed and on necropsy showed miliary tuberculosis did not present clinically any obvious or suggestive symptoms of tuberculosis. Furthermore all biopsies from the parotid and iris have shown the same histologic picture of tuberculosis of "a particularly fibrosing and non-caseating type."

Four additional cases have been reported during 1933 and 1934: Mohn[5] reported one during the course of which a pulmonary infiltration, probably tuberculous, developed; and Tanner and McCurry[6] reported three others, in one of which biopsy of the parotid revealed a tuberculous lesion in which tubercle bacilli were demonstrated.

The two following cases illustrate this condition, the second having been observed for a time by one of us (J.M.L.).

Report of Cases

Case 1. Mrs. L. H., aged 34 years, presented herself at the office of one of us (I.D.K.) on January 30, 1934, complaining of puffiness of the eyelids, fogged vision, and swellings on the side of the face. She had enjoyed good health aside from recurring "colds" up to June, 1933, when she began to feel weak, easily fatigued, and at times drowsy. During September, 1933, numerous reddish-purple, slightly tender blotches appeared on the lower extremities and remained until about the middle of January, 1934. About the middle of September, 1933, the visual disturbances appeared and became progressively more marked. At the end of November, 1933, the left side of her face became swollen and shortly thereafter a similar swelling appeared on the opposite side. These swellings were now receding. The past and family history was not significant; no history of tuberculosis was elicited.

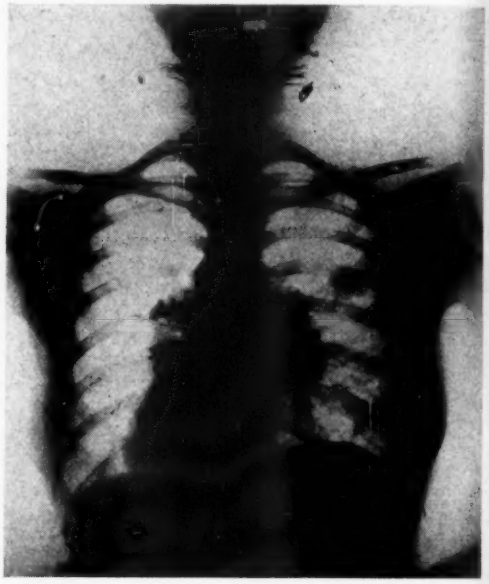

Fig. 1 (Kruskal and Levitt). Roentgenogram of chest, showing mediastinal adenitis.

The visual acuity of each eye was 20/70 improved with lenses to 20/40. Both eyes presented a slight edema of the upper lids, slight ciliary injection, large dense whitish precipitates gross-

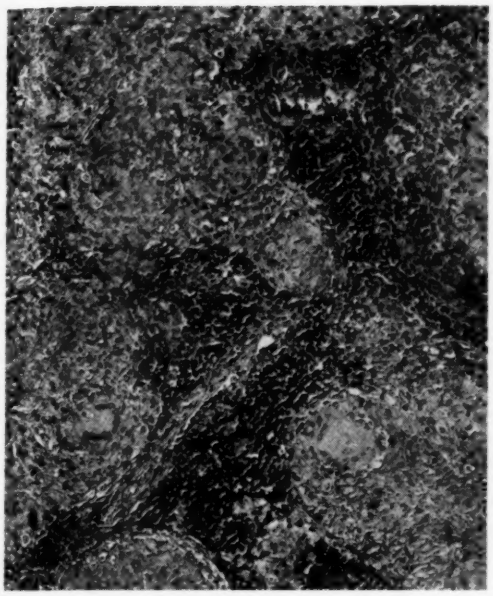

Fig. 2 (Kruskal and Levitt). A low-power view of supraclavicular gland showing tuberculous lymphadenitis (case 1).

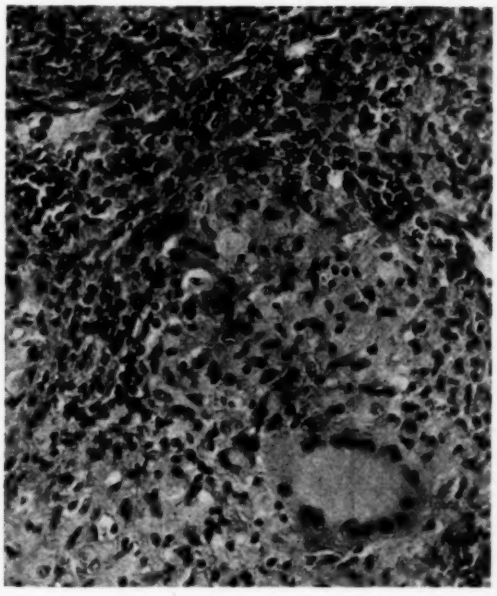

Fig. 3 (Kruskal and Levitt). A high-power view of the same section, showing epithelioid and giant cells; caseation is absent.

ly visible on the posterior surface of the cornea, cloudiness of the anterior chamber, vitreous opacities, and a normal fundus. There were posterior synechiae nasally in the left eye. Tension (Schiötz) was 22 mm. Hg in each. A diagnosis of bilateral iridocyclitis was made and the patient referred to the Jewish Hospital (service of Dr. M. A. Rabinowitz) for study.

The positive findings on physical examination were the general appearance suggesting slight anemia, the firm nodular enlargements of the parotid glands, a lymph node the size of a walnut palpated in the right supraclavicular region, and a palpable spleen. The heart and lungs were normal. During two weeks of hospitalization the temperature rose at times to as high as 100.8° F.

A chest roentgenogram (fig. 1) revealed marked bilateral glandular enlargements at both roots and clear pulmonary fields. The blood Wassermann was negative, and the blood chemistry figures were within normal limits. Examination of the blood showed: hemoglobin 75 percent; 4,200,000 red blood corpuscles, 7100 white blood corpuscles; polymorphonuclear leukocytes 76 percent, lymphocytes 24 percent, mononuclears 1 percent, eosinophils 6 percent, and basophils 3 percent. Urinalysis gave negative results. Mantoux tests (0.1, 0.5, and 1.0 mg. Old Tuberculin) were negative.

The supraclavicular gland was excised and microscopic examination disclosed a tuberculous lymphadenitis (figs. 2 and 3).

The parotid enlargements appeared grossly to have subsided by the end of January, 1934, but for several months thereafter remained palpable. The patient felt generally well after her discharge from the hospital. The iridocyclitis persisted for a period of thirteen months, then began to show signs of abatement. In addition to local treatment of atropine and hot fomentations, injections of typhoid antigen and a course of tuberculin were administered. Koeppe nodules at the pupillary margin of the iris of the left eye were noted on two occasions. Ocular examination on Feb. 5, 1935, showed a visual acuity of each eye of 20/100 unimproved with lenses, white globes, small, whitish, slightly pigmented precipitates irregularly distributed over both corneae,

hazy vitreous chambers, some opacities in the posterior cortex of the left lens, and an atrophic patch of choroiditis below the optic disc of the left eye. A chest roentgenogram on Feb. 2, 1935, showed almost the identical findings observed one year ago.

Case 2. Mrs. A.K., aged 25 years, was observed at the ophthalmological outpatient clinic of the Massachusetts Eye and Ear Infirmary. She appeared for the first time on March 1, 1932, with the complaints of redness of the left eye of one week's duration, swelling of the left side of the face of four weeks' duration, and swelling of the right side of the face of three weeks' duration. Prior to the appearance of the swellings she had been perfectly well. The only additional symptoms elicited were anorexia and nausea. She had had no fever. Past and family histories were irrelevant. Her family physician had at first diagnosed the condition as "mumps" but was now puzzled.

Examination revealed a visual acuity of 20/20 in each eye; the right eye normal in every respect; in the left eye an incipient iridocyclitis with faint pericorneal injection and numerous cells in the aqueous on slitlamp examination. Medical consultants at the clinic of the Massachusetts General Hospital expressed the opinion that the condition was not epidemic parotitis owing to the absence of signs of parotid inflammation other than the enlargements.

A chest roentgenogram revealed some prominence of the pulmonary conus and pulmonary vessels and clear pulmonary fields. X-ray films of the parotid regions showed no signs of calculi. X-ray films of the teeth and sinuses were negative.

An active iridocyclitis developed in the left eye with dense, whitish, keratitic precipitates and a hazy vitreous. On March 18, 1932, beginning inflammation of the right eye was noted and subsequently a full-blown iridocyclitis developed in that eye. Typical evanescent nodules at the sphincter margin of the irides were observed on a few occasions. Posterior synechiae appeared in both eyes after local treatment (atropine and hot fomentations) had been dispensed with for a period of a few weeks, contrary to medical orders. The uveitis reached its peak in each eye about August, 1932. From this time on the keratitic precipitates became smaller and fewer, the aqueous less cloudy, and the vitreous clearer. In November and December, 1932, at the last visit to the clinic all signs of inflammation had disappeared, the visual acuity was 20/30 in each eye and the only material residual of the intraocular inflammation was the irregularity of the pupils.

Summary

The salient features of the syndrome known as uveoparotid fever or uveoparotid tuberculosis are reviewed. The principal evidence supporting the belief that the condition is due to tuberculosis is presented. Two typical cases are reported. In the first case tuberculous infection was proved by biopsy of an enlarged lymph node which showed a tuberculous lymphadenitis.

We wish to thank Dr. J. Herbert Waite, of Boston, for the use of the clinical notes of case 2.

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INTRACAPSULAR EXTRACTION OF THE CRYSTALLINE LENS WITH ELECTRODIAPHAKIA

Method of Lopez Lacarrère

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Translated by Dr. W. H. Crisp

The author describes a modified technique of electrodiaphakia and a new five-filament electrode for intracapsular extraction of the lens. The results in a group of cases are recorded.

Unquestionably there is a steady increase in the number of ophthalmologists who favor intracapsular extraction of the lens, in spite of certain technical difficulties of the method and the dangers which it presents, particularly for restless patients.

The extracapsular operation, much safer and presenting fewer risks, offers less brilliant optical results, for the visual acuity is often not greater than one fourth or one third, and it also exposes us to the prospect of secondary cataract, always irksome and detracting from the value of the original operation.

All of us earned our first laurels with extracapsular extraction, and all of us have experienced a desire to realize the ideal of extraction by the intracapsular method.

For the latter purpose the following approaches are available: the Smith operation, the capsule forceps operation, phacoeresis, and electrodiaphakia.

All of these procedures present advantages and inconveniences, which I shall not enumerate as regards the first three since they are familiar to everyone. I propose to deal solely with electrodiaphakia, a definitely new, original, practical, and safe method for achieving complete extraction of the lens.

Theoretically, the fundamental logic of the procedure is unquestionable. It was met with enthusiasm when demonstrated by the author at Madrid on the occasion of the last International Congress. Then the enthusiasm waned, and those ophthalmologists who carried out the procedure abandoned it. Even Lacarrère himself kept silence, and his excellent articles, full of logic and ample from the experimental side, were lacking in practical instructions.

What caused this lack of interest? The evident fact that the results did not go beyond those from extracapsular extraction and only quite occasionally attained the intracapsular objective. Naturally no one was interested at all in using the electrical method for extracapsular extraction; for this a cystotome was adequate.

In spite of these negative results, I was attracted to the method, because I regarded as logical and reliable the experiments and arguments put forward by Lacarrère. I therefore undertook to study carefully the reasons for rupture of the capsule*.

I soon found that the three factors leading to this mishap were: (1) The capsule broke instead of coagulating. (2) In most cases the unaided use of the electrodiaphake (fig. 1) was inadequate for breaking the zonule. (3) The current employed was manifestly insufficient. Luckily it proved possible to eliminate these factors.

Lacarrère's handle (fig. 2) is ingeniously designed, but one must know how to manage the spring. If this is released suddenly, the ends of the wires penetrate the lens capsule so rapidly that they rupture without coagulating it, the coagulation occurring only after penetration of the nucleus. But since the capsule has been ruptured and has not formed a coagulum adhering to the wires, we have merely executed a cystotomy and upon withdrawing the nucleus we leave behind the ruptured capsule. It is necessary to avoid this and to coagulate the capsule in such a

* I wish to thank the Valencia representative of the firm of Siemens Reiniger Veifa for putting at my disposal the electrodiaphake and other necessary material for carrying out my experiments.

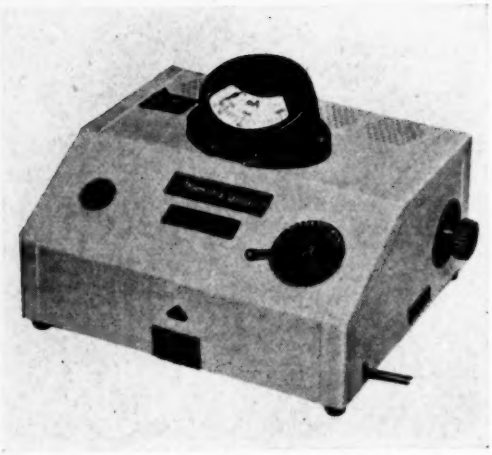

Figure 1

Figure 2

Figure 7

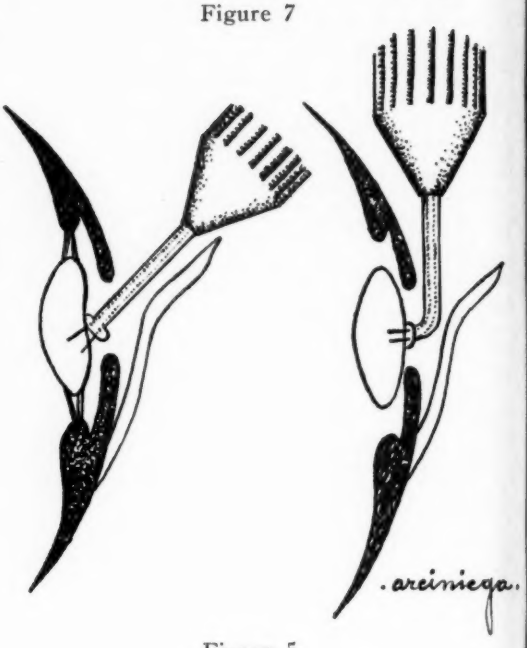

Figure 5

Figure 3

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Figure 6

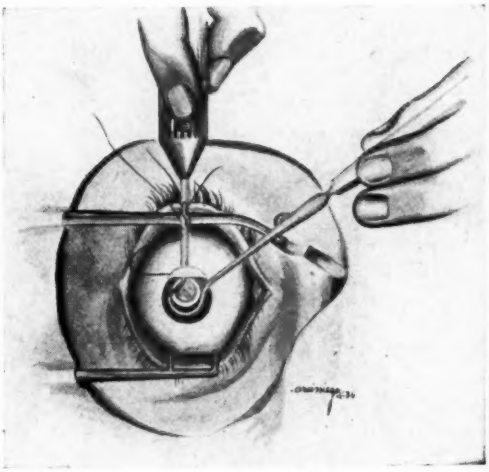

Figure 8

way that it forms a solid mass with the wires and the lens nucleus. We shall see later how to accomplish this.

The second cause of failure is the attempt to extract the lens without counterpressure. Under this condition it is no wonder that elevation of the needles tends to produce rupture of the capsule. If it were not for Knapp's idea of aiding the forceps by counterpressure, the forceps method would yield only a very modest percentage of successes. I recall very well that ten years ago leading surgeons were performing capsulectomy with the Kalt forceps, and we all remember that this author recommended his forceps for tearing the capsule, sometimes accomplishing the further result of extracting the entire lens. I have even seen complete extraction performed with Fuchs's toothed forceps. But occasional success in withdrawing the whole lens does not confer the least importance on any procedure. I therefore regard it as indispensable to apply counterpressure to favor exit of the lens.

The current employed when Lacarrère initiated his method was frankly inadequate, and so I believe is that which he now uses. I have concluded that 100 ma. is insufficient, especially with the condenser electrode, which in my opinion ought to be discarded. In a recent article (Archivos de Oftalmologia Hispano-Americanos, 1934, October, p. 527) I dealt with the question of the intensity of current, which ought to be at least 150 ma. for soft or semisoft cataracts, and 200 to 250 ma. for hard cataracts.

Another inconvenience is to be found in the glass terminal proposed by Lacarrère, which I have found awkward to handle (fig. 3*). In view of this inconvenience, I modified the terminal as shown in figure 4. Using the former model, there is, as shown in figure 5, a tendency for the heel of the instrument to push into the lens while the anterior wire rises, favoring rupture of the capsule and causing unnecessary violence to the lens. The modified form avoids this difficulty.

I have recently adopted a new modification of the handle and terminal (fig. 6). The handle is larger, and so constructed as to contain a solid piece of glass through which pass five tunnels carrying as many wires to form the five-wire electrode. The wires are completely insulated from one another, and penetrate the lens separately so as to give a large circular mass of coagulation adhering to the electrode. The five wires are moved by a single spring.

Technique: The preparation is as in other cataract operations. Maximal mydriasis is absolutely necessary. The euphthalmin-cocaine ointment recommended by Barraquer has not always given the desired result, and I have had some patients who when the operation was begun had only partial mydriasis. I use an ointment with the following formula: homatropin 0.20, 1 to 1000 adrenalin solution 2 drops, neutral vehicle 10 grams. I use this every three hours the day before the operation, and increase the frequency to every hour if the mydriatic effect is inadequate, with a few last doses at ten-minute intervals. With this technique we obtain complete mydriasis, even in diabetic patients; and such complete anemia that we are not bothered by even a drop of blood in cutting the conjunctival flap.

For local anesthesia I use cocaine four-percent solution and for the O'Brien akinesia novocaine four-percent solution (4 c. c.). I give a retrobulbar injection of 1.5 c.c. of two-percent novocaine solution with two drops of 1 to 1000 adrenalin solution.

After the usual toilet of the eyelids and conjunctiva, insertion of Arruga's lid speculum, and insertion of a suture into the superior rectus, I cut a triangular conjunctival flap from above downward, as in performing the Elliot operation, carefully dissecting the sclerocorneal limbus. I place a corneal suture according to the technic of Gomez Marquez, and push the thread to one side so as not to disturb the subsequent manipulation. I then seize the conjunctival flap with forceps, using

* The illustrations for this work were executed by Dr. Fernando Arciniega, medical student, to whom I here desire to express my appreciation.

the flap for fixation of the eyeball, and perform keratotomy with a narrow lance the point of which is introduced behind the flap. I enlarge the incision with special blunt-nosed scissors (fig. 7) which when closed serve as a spatula. This keratotomy is much easier to perform, and gives better results as regards cicatrization and absence of astigmatism, than the most perfect incision obtained with the Graefe knife.

I do not do an iridectomy, except in a very restless or catarrhal patient, and in such a case I use a peripheral iridectomy. I dislike complete iridectomy for esthetic and optical reasons and because of the great ease with which the pillars of the coloboma may become incarcerated in the wound.

The diathermy apparatus should have been tested previously and the amount of current to be employed noted. The handle is taken in the right hand, withdrawing the steel wires by means of the spring, which is managed with the index finger. The assistant raises the corneal flap so as to expose the lens, and the operator places on the lens the spatula-shaped terminal of the electrode. The electric circuit is completed with the pedal of the apparatus, and then the wires are allowed to project very gradually and never suddenly. The object of this is to coagulate the capsule perfectly. When this has been accomplished the current is shut off, the assistant releases the cornea, and the operator, instead of pulling the handle upward, executes a series of movements in all directions with the object of separating the lens from the zonule, at the same time making counterpressure with a strabismus hook or better still with Arruga's hook (fig. 8), which he holds in his left hand.

When the zonule has been broken and the lens is about to pass through the wound, the wires are released with the spring, and expulsion is completed with the hook, while the operator's right hand takes charge of the corneal suture, closing the opening immediately. Three conjunctival sutures are used, and eserine ointment is applied to avoid incarceration of the iris. As soon as the anterior chamber is reëstablished, two-percent homatropin solution is instilled daily.

Results: I shall now describe the results which I obtained in twelve cases.

Case 1: C. N., 59 years old. Mature cataract of the right eye. Imperfect keratotomy with Graefe knife, catching the iris and producing a large hemorrhage. Iridectomy completed with forceps scissors. Application of the electrodiaphake according to Lacarrère's technic. Rupture of the capsule. Negative result.

Case 2: J. B., 54 years old. Semisoft cataract of the right eye. Correct keratotomy with lance, no iridectomy, complete extraction. Positive case.

Case 3: V. R., 62 years old. Complicated cataract (iridocyclitis) of left eye. Perfect keratotomy. Complete iridectomy on account of the nature of the cataract. Complete extraction. Positive case.

Case 4: M. S., 58 years old. Semisoft cataract of the left eye. Good keratotomy, peripheral iridectomy. Complete extraction. Positive case.

Case 5: J. LL., 58 years old. Mature cataract of the right eye. Good keratotomy, no iridectomy. Complete extraction. Positive case.

Case 6: R. P., 72 years old. Mature cataract of the right eye. Good keratotomy, previous iridectomy by a colleague. Rupture of capsule. Loss of vitreous during extraction of cortex. Incarceration of one iris pillar. Negative case.

Case 7: A. LL., 39 years old. Mature diabetic cataract of the right eye (45 grams of glucose per liter). Good keratotomy, no iridectomy. Complete extraction. Positive case.

Case 8: R. V., 63 years old. Complicated cataract of the right eye. Good keratotomy, no iridectomy. Complete extraction. Positive case.

Case 9: L. P., 82 years old. Soft cataract of the right eye. Good keratotomy, no iridectomy. Complete extraction. Positive case.

Case 10: B. B., 82 years old. Morgagnian cataract of the left eye. Good keratotomy, peripheral iridectomy. Rupture of capsule. Negative case.

Case 11: C. R., 63 years old. Soft

cataract of the right eye: Good keratotomy, no iridectomy. Complete extraction. Positive case.

Case 12: L. T., 60 years old. Immature cataract of the right eye. High myopia. Good keratotomy, no iridectomy. Complete extraction. Positive case.

Summary: Out of twelve cases operated upon, complete extraction was accomplished in seven without iridectomy, in two with iridectomy, and the capsule ruptured three times.

The five-filament electrode was used only in the last two cases. It will be seen that the percentage of successes is analogous to that obtained with forceps aided by counterpressure. The percentage of successes with the forceps comes after long experience, whereas we are able to attain it with electrodiaphakia from the beginning.

As regards phakoeresis, in the hands of Barraquer, it is necessary to say that this operation gives a perfect result so far as total extraction is concerned, but that the results are not so flattering in relation to loss of vitreous. In our case 6, vitreous was lost as the result of an unexpected movement and not by any fault of the electrodiaphake. I firmly believe that our percentage of complete extraction will still further improve to the extent to which we are able to establish fixed rules in regard to intensity of current.

I thus regard Lacarrère's method as safe, easy, and convenient for the execution of intracapsular extraction of cataract. It has above all the enormous advantage of eliminating preoccupation with the condition of the lens capsule, which Professor Basterra has well named the cornerstone of complete extraction. For, since electrodiaphakia takes hold of the crystalline lens in its entirety, the condition of the capsule is a matter of indifference. Conversely, it is essential to coagulate the capsule perfectly, as I pointed out in the first place.

Avenida Nicolas Salmeron, 13.

RECESSION OPERATION WITH CONTROL SUTURE

Using Correction Lenses to Effect Muscle Balance During Convalescence

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An operation is described for the correction of heterotropia and heterophoria, a suture being used by which the muscle can be readjusted, if necessary, during the first few days of convalescence. The eyes are not occluded with bandages or eye patches, but, instead, correction lenses are worn, thereby preserving a state of functional rest in the extrinsic muscles. Any overcorrection or undercorrection that may appear in the first three or four days can be adjusted by means of the suture. There is a brief review of all the literature on the recession operation since its introduction. From the Ophthalmological Department of the Chicago Eye, Ear, Nose and Throat Hospital. Read before the Chicago Ophthalmological Society, November 19, 1934.

Realizing the inaccuracies of measurements and, therefore, the possibilities of mistaken results from the attempt to make calculations on muscles, a procedure often advocated by many authors in their work on the various operations for strabismus, the author has devised what he believes to be a more simple and practical operation, which, with some slight modifications, he has used for eight years.

Anatomy and physiology. A brief review of the topography of the capsule of Tenon and muscle attachments will recall to mind the close relationship of the capsule to the external muscles. So close is this relationship that a tenotomized muscle will not recede far unless the capsule is cut so that it may recede as well. This point is important and will be referred to later.

Peter's simple description is here quoted:

> A membrane composed of fibrous and connective tissue surrounds the eyeball from the cornea to the optic nerve. In addition to the tunica of the eyeball, reflections of the same general character follow the muscles, forming muscle sheaths, while other specially differentiated reflections or thickened portions known as check ligaments, pass to the bony orbit from the muscle sheaths. A fourth modification of this same fascia is suspended beneath the eyeball with attachments to the outer and inner orbital walls, serving, as it were, as a hammock in which the eyeball rests—the suspensory ligament of Lockwood.

In consideration of the close relationship of the muscle capsules and the so-called check ligaments, all of which are a portion of the capsule of Tenon, which in turn is attached firmly to the globe at the limbus and to the orbital walls, it is safe to assume that while slight movements of the eyeball may not require much exertion on the extrinsic muscles, extreme movements can be brought about only by a supreme effort on the part of these muscles to change the shape and relation of the various fibers in the capsule necessary to produce such results.

Extreme excursion or rotation of the globe is procurable operatively in either of two ways: (1) by strengthening the rotation force, giving the muscles a better purchase on the globe by advancement, resection, or tucking; (2) by diminishing the amount of resistance by setting back the muscle and, further, by breaking down the resistance furnished by the capsule through its check ligaments.

The actions of the various extrinsic muscles of the eyeball are so well known by all that it is not necessary to refer to them. However, there is an existing physiological condition which it is necessary to mention. Various stages of muscle activity and rest are divided into three states: (1) anatomic rest[1]; (2) functional rest; (3) dynamic or active state.

Anatomic rest is effected when the patient is asleep and the eyes in this state are usually turned up and out.

Functional rest comes when the patient or subject is conscious and the muscles of the eyes are not responding to stimuli but are in a state of parallel fixation. This, of course, can come only in emmetropic eyes, or in the case of ametropia, only after the use of properly fitted lenses.

The dynamic or active state occurs

while the eyes are changing their points of fixation and during convergence, both actions being more or less associated with accommodation.

Indications. Berens[2] gives the indications for recession operation as (1) alternating esotropia; (2) concomitant esotropia (operation to be performed on the fixing eye); (3) divergence excesses without exotropia; (4) exotropia; (5) postoperative exotropia, and counterindicated in hypertropia.

Age at time of operation. This operation should be done as early as possible after the wearing of properly fitted glasses and exercises have failed to bring the desired results. Too often the operation is postponed until the child is old enough to have the operation performed under local anesthesia. This is a mistake. In the author's experience, a general anesthesia is seldom necessary after the sixth year.

Dunnington[3] says that the time to operate in any given case is as soon as one has made up his mind that the eye cannot be strengthened by other methods, and stresses the early operation. My experience has taught me that this is sound judgment.

Sutures. There is a wide range of ideas concerning sutures. Jameson[4] used three interrupted sutures according to the technic described in his first publication on the recession operation.

Lombardo[5] uses a single suture placed in such a manner as really to serve as two sutures.

Peter[6] uses a silk suture which he ties with a loop, thereby allowing for a readjustment on the second or third day.

Alexiades[7] performed a controlled tenotomy in which he used a silk suture to prevent the muscle from receding farther than desired, but he did not use the suture for further adjustment.

Curdy[8] uses a single suture with which he is able both to secure the muscle to the sclera and also close the wound.

Mott[9] ties the muscle rather loosely to the stump but firmly to the capsule of Tenon.

Goldenburg[10] used a control suture for the tenotomized muscle which is quite simple and easy to perform and is based upon good sound judgment. However, his operation might better be called a recession operation.

One other suture has been described by Peter[11], somewhat on the order of the one described in this paper, but his suture involves scleral attachments to the upper and lower sides of the muscle and then through the stump.

Reese[12] stresses the dangers of perforation of the sclera in an attempt to place a scleral suture and adds that the danger can be lessened by passing the needle through the superficial layers so that the passage can be seen.

Alexiades[13] used a suture somewhat similar to the author's with which he claims he can readjust the muscle attachment as the case requires.

Davis[14], of Madison, Wisconsin, has modified Jameson's operation by placing the conjunctival incision over the tendon which, in the author's opinion, is very commendable. He uses a 000 catgut and stitches the muscles direct to the sclera.

Wilkinson[15] uses twenty-day, 000 chromic catgut and anchors the muscle to the tendon stump, thereby avoiding the scleral stitch.

Jameson[16] has recently described a new suture which he calls the "ligated suture." It consists of eight knots tied in the suture which are buried. It seems that it would be better if a suture just as secure could be made without so many knots.

The advantages of the suture control in recession operations are obvious. Much has been said, in the literature on other described operations, of the number of millimeters a certain muscle should be recessed or advanced, but when it comes to the actual performance of the act one finds that accurate measurements are quite impossible, and there is a strong feeling that altogether too much guesswork is involved in the procedure.

In the animal experiments performed by Carroll and Blake[17] it was demonstrated that fairly firm attachment of a muscle (which had been tenotomized and not stitched to the sclera) did not take place until about ten days after operation, and that in some cases it was

not well attached even to the fourteenth day. In the author's opinion, this was due to the action of the muscle during convalescence, the delicate attachment having been repeatedly broken up. It was also demonstrated in the experiment that during the first few days very little attachment takes place between the muscle and sclera. This supports the author's practice of changing the position of the muscle on the second or third day after operation.

Results. In the hands of the author, the recession operation has had a wider range of usefulness than has any other one operation for muscular derangements, and while there is a variance of opinion in the literature concerning the amount of correction to be expected (some say 10 degrees and others as much as 20 degrees), the author can usually secure as much as 30 degrees of rotation with good practical results and has secured as high as 50 degrees of rotation.

The amount of rotation following a recession operation depends upon two factors: (1) the amount of tone of the tenotomized muscle and the overstretching of its antagonist; (2) the further cutting of the capsule upward and downward from the muscle attachment.

Jameson[18] claims that recession and suturing the muscle to the sclera as far back as the equator is a safe procedure, that satisfactory results are obtained in 90 percent of suitable cases, and that about 25 degrees of correction follows 5 mm. of recession.

It has been stated[19], and this is also the opinion of the author, that the final effect of an operation which involves the setting back of the muscle can be better foretold than the final result following a resection operation.

If fusion is not present, the end results will depend entirely upon mechanical results and the final benefit will be a cosmetic one only; but, if fusion is present, it will be possible to add to the cosmetic effect that of single binocular vision, which is the thing to be desired in all cases.

In the latter case it is necessary to bring the point of fixation of the one eye well within the range of fusion of the other eye in order to be assured of a good result.

Jameson[20] further states that the value of tenotomy has been further increased by the advent of the recession operation and that the idea that, in case computation and gradation should go amiss, and overcorrection or undercorrection should result, it cannot be remedied at the time of operation, is a mistake and states how this can be overcome.

Davis[21] of Washington, uses the recession operation for the correction of phoria; the author also has found it valuable in phorias, especially those of muscular hypertension.

Recession Operation

Anesthesia is induced by three instillations of a 10-percent cocaine solution in the conjunctival sac at five-minute intervals. A pledget of cotton (fig. 1) is placed over the muscle attachment and saturated with a 4-percent cocaine solution and the lids closed over it for three minutes. An injection of a 1-percent solution of novocaine is made under the conjunctiva, above and below the muscle (fig. 2). This is absorbed into the tissues under gentle massage of the closed lids.

In children under six years of age or in very nervous children over that age, a general anesthesia may be required.

A 10-mm. incision (fig. 3) is made in the conjunctiva in a vertical position just over the tendon attachment. The conjunctiva is freed from the capsule. The capsule is picked up, just above the tendon, about 2 mm. posterior to the incision, and opened. It is also opened just below the muscle. A strabismus hook (fig. 4) is placed under the tendon followed by a muscle clamp (fig. 5) which includes the conjunctiva, capsule, and muscle. The muscle tendon is now severed from its attachment to the sclera.

A double-armed, No. 5 silk suture is inserted in the muscle just behind the clamp, from within outward, each needle passing through the muscle, capsule, and conjunctiva, about 1½ mm. from the center of the muscle, and is

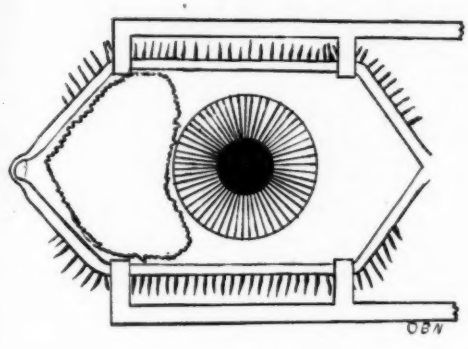

Fig. 1 (Nugent). Pledget of cotton saturated with 4-percent cocaine solution is placed on the conjunctiva over the muscle attachment.

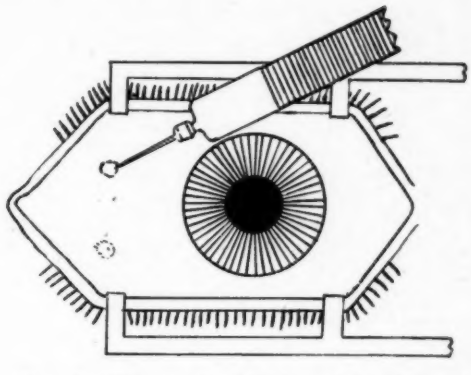

Fig. 2 (Nugent). Making injection of 1-percent novocaine solution above and below the muscle.

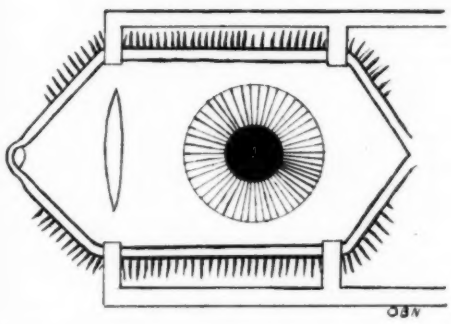

Fig. 3 (Nugent). Vertical incision over muscle attachment through conjunctiva only.

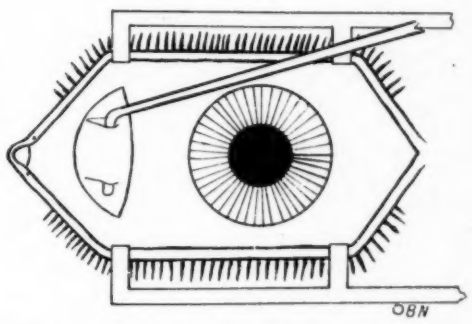

Fig. 4 (Nugent). Capsule of Tenon has been opened above and below, and strabismus hook placed under the muscle.

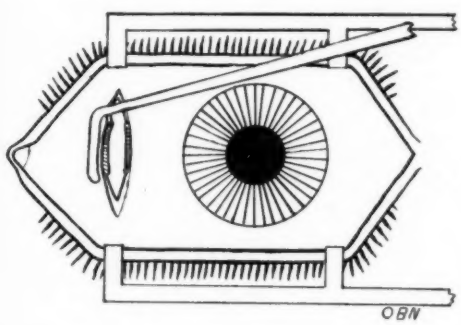

Fig. 5 (Nugent). Muscle clamp is placed in such a manner as to include conjunctiva, capsule of Tenon, and muscle; the muscle tendon is severed near its attachment.

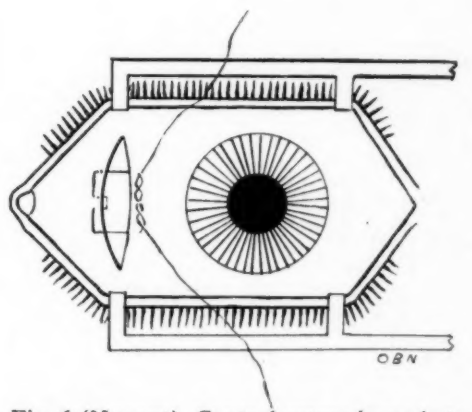

Fig. 6 (Nugent). Control suture is made to include conjunctiva, capsule, and muscle, and is secured with a surgeon's knot.

brought back again through the conjunctiva, capsule, and muscle, one needle near the upper and the other near the lower border of the muscle.

The upper end of the suture is then passed through the extreme upper edge of the stump and the lower end through the lower edge, passing on through the capsule and conjunctiva also. The muscle clamp is removed and a surgeon's knot loosely tied (fig. 6).

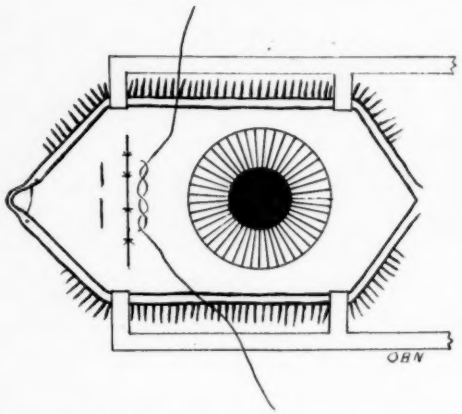

Fig. 7 (Nugent). Conjunctival incision is closed with four fine-silk, interrupted sutures. These do not include the capsule.

Both eyes are now opened and a comparison made with the fellow eye to ascertain the results. This is done by using a candle or the light of an electric ophthalmoscope to produce the corneal reflex. If an overcorrection has resulted, the surgeon's knot can be drawn tight enough to correct it. If, however, the correction is insufficient, the capsule should be cut upward and downward from the original incision, the latter being accomplished by passing a strabismus hook under the capsule to catch all lateral muscle, tendon, or capsule attachments to the sclera. This procedure will usually produce many millimeters more of rotation.

If cutting the capsule does not secure sufficient correction, it will be necessary to produce a slight overcorrection by some form of advancement, tucking, or resection of the opposite muscle. The author usually prefers the Worth advancement, after which the eyes are adjusted as before.

Closure of the wound in the conjunctiva is made by four silk sutures, using the very finest silk (fig. 7). The capsule of Tenon is not sutured.

If, by this procedure, undercorrection or overcorrection is the result, then, in order to secure a more accurate correction, the patient is placed in an upright sitting position on the operating table, the correction lenses adjusted in front of the eyes, a Maddox rod placed in a horizontal position over the fellow eye and the patient is made to observe a candle held about ten feet away. The candlelight can be made to come into the vertical streak of light produced by the Maddox rod by either tightening or loosening the surgeon's knot, as the case requires.

Fig. 8 (Nugent). The long ends of the control suture are attached to the forehead by a piece of surgeon's adhesive.

The eye, being now in the proper position, the long ends of the suture are fastened to the forehead by a piece of surgeon's tape (fig. 8). The lenses are left in position and the patient is instructed to wear his spectacles during the period of convalescence. A patch is placed over the eye that has been operated on for the sleeping hours only.

The action produced by the converging muscles as a result of simultaneous stimulation with the action of the ciliary muscle might be termed dynamic index. This should be carefully studied during the first three or four days following operation.

If, during the necessary accommoda-

Fig. 9 (Nugent). Right divergent strabismus: before, immediately after, and one month following operation.

Fig. 10 (Nugent). Strabismus: before, immediately after, and one month after recession operation.

tion for distant vision in hyperopia, there is a convergence of visual axes, the dynamic index is plus; and if there is a divergence of the visual axes during accommodation, the dynamic index is minus. If the visual axes are parallel during accommodation for distance, then the dynamic index may be said to be nil.

In patients with hyperopia, it is quite obvious that in perfect results following a strabismus operation, that is, that with the proper correction before the patient's eyes the visual axes are parallel, there should be some degree of plus dynamic index without glasses.

After care. Twenty-four hours after the operation the patient is tested with the Maddox rod, both with and without the correcting lenses; the dynamic index should be nil with lenses in position.

If, with the correcting lenses in place, there is found to be an overcorrection, the surgeon's knot can be tightened; and, if there is an undercorrection, it can be loosened. This can be done after instilling a few drops of 1-percent butyn solution into the conjunctival sac. If the proper adjustment is made at the time of operation it is not often necessary to make further adjustments. Similar tests should be made on the second and third days as well, and any adjustment that is necessary.

It has been the author's practice to place all eyes in as nearly a state of functional rest as is possible, and this is

Fig. 11 (Nugent). Right eye crossed when lenses are not worn. Extrinsic muscles in dynamic state.

Fig. 12 (Nugent). Same patient as in figure 11. Parallel fixation with lenses in place. Extrinsic muscles in a state of functional rest.

Fig. 13 (Nugent). Parallel fixation without lenses, but extrinsic muscles are in dynamic state. Patient has 4 D. of hyperopia.

Fig. 14 (Nugent). Same patient as in figure 13. Right eye divergent while correction lenses are worn. Extrinsic muscles in a state of functional rest (postoperative).

accomplished by placing properly fitted glasses on the patient to be worn during convalescence. The eyes are not occluded, the glasses being worn during the patient's waking hours. This prevents any undue action and counteraction of the various extrinsic muscles which may be the result of accommodation (especially in hyperopic patients) and places all extrinsic muscles in as nearly a balanced relation to each other as can be obtained. This is the proper position, the author believes, under which healing should progress after any type of operation for strabismus.

That we may be convinced of the truth of this statement, let us consider a case of convergent strabismus with high hyperopia in which the strabismus is rectified with the correction of the hyperopic error (figs. 11 and 12).

Undoubtedly, it will be admitted that the most balanced relation of the muscles exists at the time the lenses are worn. Another case in which the effort of the act of accommodation is exemplified in the action of the extrinsic muscles is shown in a patient whose eyes are in a state of parallel fixation without glasses but diverge when proper correction of the hyperopia is made. (figs. 13 and 14).

The patient is sent home on the fifth day and instructed to use the eye for distance only during the next week, using glasses during the waking hours. The conjunctival sutures can be removed on the sixth day and the muscle suture on the fourteenth day.

Muscle exercises and training to correct any muscle imbalance should be begun in about one month after the operation.

Conclusions

1. The recession operation, as here described, simplifies surgical intervention for the correction of heterotropia, and can also be used to reduce heterophoria.

2. Correction lenses are worn by the patient during all waking hours of convalescence. This forbids excessive accommodation and places the extrinsic muscles in a more balanced state of functional rest.

3. The possibility of readjusting the muscle suture by means of the control, in cases of under- or overcorrection has proved a decided advantage in the hands of the author.

4. The benefits to be hoped for are two-fold: (1) The mechanical correction of the strabismus, producing a cosmetic effect; and (2) reëstablishment of binocular single vision. The former can be secured in almost every case; the latter only when fusion is present or can subsequently be developed.

The author wishes to express his appreciation to Dr. W. A. Fisher, for his valuable counsel in the beginning of this work; especially for the idea of the control suture.

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NOTES, CASES, INSTRUMENTS

DINITROPHENOL

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The following brief report of three cases of bilateral acute swelling of the crystalline lens in women who had been using dinitrophenol is recommended to the serious consideration of all ophthalmologists.

Mrs. H. H., aged 44 years, first complained of blurry vision on March 1, 1935. Her vision was O.D. 20/20-; O.S. 20/30. There was no evidence of lens opacities (telephone report from a better-than-average optometrist). The vision slowly grew worse but she was able to do her office work until May 1, when her vision failed rapidly. I saw her first on April 4, when her vision was O.D. 4/200; O.S. 2/200. The opacity in each lens was chiefly in the posterior capsule and subcapsular area, causing a brilliant silvery reflex. The tension was slightly above normal.

Fifteen hours later, she developed hypertension in her left eye. A paracentesis was performed. Eserin was ordered for both eyes, but she discontinued it a few days later, "because the drops hurt." On May 11, severe pain in the right eye developed during the night. A paracentesis was done at once, and one hour later, an iridectomy was performed on each eye. The marked swelling of the lenses made the iridectomy difficult.

Excepting infected tonsils, no foci of infection were found. The urine was free from sugar and the blood sugar was 110. The spinal-fluid Wassermann test was negative. A careful history showed nothing of an etiological nature, except that she very reluctantly stated that she had been taking two tablets of dinitrophenol at meals for four months less than a year ago, had used the drug until her "feet and hands grew numb" and had lost 55 pounds. About two months ago she found that she had 35 tablets left. On finishing them she had intended to buy more, when her vision failed.

Mrs. E. G., aged 39 years, was a postgraduate student at the University of California. At the student infirmary her vision in September, 1934, was 20/20 in each eye. In October the left eye began to "feel blurry" and on December 1, the right eye also became blurred. By January, 1935, she could distinguish objects only. She has since had two attacks of acute glaucoma requiring surgical treatment.

All tests for sugar and foci of infection were negative. She attributed her cataracts to lack of vitamins following a reducing diet. When asked if she took dinitrophenol, she said, "Yes, three tablets at each meal for two months one year ago and again for three months prior to the loss of my vision."

Mrs. B. H., aged 36 years, is a patient of Dr. Bruce Stephens of Alameda, California, who kindly permitted me to add this case report to my list. Her vision began to fail in each eye two months ago and is now O.D. 20/70; O.S. 20/200; both cataracts have a brilliant, silvery, cholesterin-crystallike appearance such as was seen in the first case. All sugar and other diagnostic tests were negative. One year ago, she took dinitrophenol, three capsules a day for four months, and lost 35 pounds.

So far nothing in the literature on dinitrophenol poisoning in relation to the eyes has been found. These three cases* of rapidly developing bilateral

* Since writing this report, early in May, I questioned several ophthalmologists at the California State Medical Convention. Dr. W. D. Horner of San Francisco said he had a case of bilateral cataract in a woman who used dinitrophenol; Dr. L. Briggs of Sacramento had a similar case but was uncertain about the dinitrophenol relation; Dr. Frank Baxter of Oakland has a case and Dr. Horner, now much interested, has found three more cases in San Francisco, and I am told of still another interesting group of dinitrophenol-cataract cases in San Francisco which undoubtedly will be reported soon in detail. In the first case in this report, the patient used the drug secretly; in the last two it was used under medical supervision as it was in the majority of those mentioned in this footnote.

cataract in nondiabetic women of early middle age are in themselves unusual; when considered in relation to a drug that is being secretly and carelessly used by so many women today, they are of special interest.

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THE FIRST TRIAL CASE

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It is not generally known that the first trial case was made by Dr. Fronmüller of Fürth, Germany, a physician who practiced internal medicine and ophthalmology. He published his idea in the "Journal der Chirurgie und Augenheilkunde," in 1843, volume 32, page 174. Up to this time and later, fitting eyeglasses was the work of opticians, and not until Arlt's time did physicians take over this function.

The translation of Fronmüller's article shows that there were others who felt that opticians should not be trusted to do this delicate work. It is to be remembered that cylinders were unknown at the time this paper appeared and that refraction was merely a trial of plus and minus spheres without the aid of skiascopy and with the presumption that both eyes should be alike. Besides collecting the lenses in a case and arranging them in order, Fronmüller also invented a spectacle frame to allow easy placing and replacing of lenses. The article also shows that eye physicians were interested in the question of training the amblyopic eye at that time, just as they are now. The doctor improved the poorer eye up to a certain point and no further which is much like the experience of most of us now. Cases of high myopia in which stronger and stronger lenses were required were as unsatisfactory in his day as those we work over now, but the assumption that lenses alone could hold them in check must be credited to a hopeful nature rather than to the product of experience.

The ethics of the opticians of which Fronmüller complains were no different from those of the average dispenser of eyeglasses today who is a business man and has not the professional view point; it is folly to expect anything else. The author's comment on the Franklin bifocal spectacle is quite like that of Dolland. Franklin wrote to Whately of Passy in 1784, describing his idea and the latter took the letter to Dolland, who said, "they can only serve particular cases, are not for eyes in general." Dolland was in distinguished company when he disagreed with Franklin but I would rather be with Franklin than with George III, for Franklin had the faculty of turning up on the correct side of almost any question.

A translation of Fronmüller's article follows:

"Well-known works on ophthalmic hygiene advise giving over to the optician the selection of eye glasses. I cannot subscribe to this view. As little as we would leave it to the apothecary to decide the dosage of medicines we prescribe, so little should we depend upon the judgment of the optician to determine the proper eyeglasses. This matter is of too much importance to our eye patients for the physician to refuse the responsibility. Not infrequently the fate of the suffering eye depends upon the selection of the lens; properly selected lenses can often lead to gradual improvement and improperly fitted lenses to blindness. How many unfortunates have I seen hurried through a succession of stronger and stronger lenses, finally to arrive at the brink of blindness. Thus, for example, an unfortunate person of our city finds himself already wearing the strongest number of concave glasses (No. 1). He can see through these with difficulty and soon will be a victim of blindness. It is probable that had he obtained his glasses at the beginning under scientific guidance, this catastrophe would not now hang over his head. Since the physician should select the glasses for eye patients, it follows that only in him can we expect to find all the scientific knowledge that is needed to treat the special case; knowledge that does not rest alone upon optical fundamentals. The optician or eyeglass dealer will always advise the purchaser to get the glass through which he sees the best. (Furthermore, the so-called opto- or opsiameter has no other advantage than that it shows the sharpest glass.) However, these glasses may be harmful to the eyes of the patient. "The farsighted," said Beer, "may at first accept a sharp glass as little as would the nearsighted, although this might not cause irreparable damage." Often it requires all of the doctor's energy to keep the patient from this error. The eyeglass dealer, however, always remains a mere merchant who does not

know of the danger and is usually concerned only in disposing of his wares to advantage.

"The simplest lessons of ophthalmic hygiene are unknown to him. Thus, for example, I know of an otherwise skillful optician who provides many people with glasses but wears a so-called Franklin glass himself (the lenses are divided horizontally in the middle; each half has a different focal distance; the upper half is for distant vision and the lower half for near). This apparatus is a certain means of ruining the eyes sooner or later. In order to combat these evil conditions, and to supply my patients who are in need of glasses with the proper number, I have gathered together in a case for my own use the necessary kinds of concave and convex glasses (in all about 60 pairs), arranged according to their serial numbers so they can easily be found. Further, I have prepared an eyeglass frame in which the glasses can be placed at will and again removed. In this way, I have obtained the advantage of adding glasses of different focus for the right and the left eye, which is not infrequently necessary. Persons have often come to me who have been utterly unable to obtain satisfactory glasses. The cause of this usually is that there is a difference in the range of vision of the two eyes, which the optician does not take into consideration. Thus, one eye sees well and the other is neglected and continually loses power. In such cases, I have often ordered a prescription such as the following: right eye, convex glass No. 30; left eye, concave glass No. 20; and complete harmony of vision has been established. When the examination is completed, the patient is referred to a skillful optician from whom the correctly ordered number is obtained in perfect condition. Since this experience has brought excellent results to abnormal eyes, I hold it my duty to give notice of it in a journal especially designed for oculists. Subsequently, I have noted that a well-arranged selection of concave and convex glasses offers the advantage announced by Cunier (Annales d'Oculistique, v. 7, p. 87) for the method of treating various eye conditions by eyeglasses. Although I have but recently learned of this, I have had an opportunity of making a test of this nature upon a man who suffered with torpid amaurosis of the right eye. Using a No.-8 lens he could with difficulty read large print; book titles, for instance. I had the sound eye covered and he tried earnestly to read with a No. 8. Soon he could exchange this lens for weaker numbers. Within two weeks, he was able to read ordinary printed material easily with a No. 18, as he does now. There he stays. His retinal sensibility can not be brought up further. Despite all his zeal in practicing reading, the patient can not use a weaker number; nevertheless, he is much pleased with this result and now wears spectacles with a No.-18 lens for the right and a No.-40 for the left eye."

14 Eighth Avenue.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

COLLEGE OF PHYSICIANS OF PHILADELPHIA

Section on Ophthalmology

October 18, 1934

Dr. J. Milton Griscom, chairman

Optic atrophy due to thallium poisoning

Dr. J. B. Rudolphy said that Mrs. M. R., aged 38 years, had consulted him September 6, 1934, complaining of poor vision. In January, 1930, she had begun to use Koremlu Cream, a cold cream having depilatory properties and containing thallium acetate (7.18 per cent). She had applied this cream to her face before retiring, allowing it to stay on all night and often throughout the day. This practice had continued for fourteen months.

After six or seven months of this routine, she suffered a nervous breakdown and was admitted to a hospital in her home city. Her symptoms at this time were extreme nervousness, pain in all limbs, gastric pain, and vomiting, as well as weakness and fatigue. She continued to use the cream in the hospital, and while there her hair fell out and her vision became blurred.

Convalescence was gradual with recurrent vomiting and alopecia. A letter from the physician who treated the patient after she left the hospital stated that in addition to the symptoms mentioned above, she had suffered photophobia. Her vision had rapidly diminished. In November, 1932, her oculist reported paleness of the optic nerves, with vision O.D. 5/100, O.S. 5/100.

The first step in determining the etiology came through her sister's reading "100,000,000 Guinea Pigs," in which there was an exposé of Koremlu Cream with a reference to Dr. Schamberg who prescribed sodium thiosulphate to be taken in 10-gr. doses t.i.d. This course of treatment was followed for a year with beneficial effects to her general condition.

When first seen by Dr. Rudolphy, September 6, 1934, her vision was O.D. 1/60, O.S. 1/60. The pupils were moderately dilated with but slight reaction to light and accommodation; ocular rotations were full; convergence fair. The media were clear, the discs well defined and of a peculiar gray-green color surrounded by some choroidal pigment; the vessels were normal, no discrete lesions were seen.

The patient was referred to Dr. Melbourne J. Cooper for neurological examination and on September 10, was admitted to Dr. Holloway's service for further study. While at the University Hospital her visual fields were taken by Dr. Wentworth. These showed slight contraction with superior temporal quadrant cut and large absolute scotomata just above and including the fixation point. She did not recognize red.

Discussion. Dr. M. J. Cooper said that from the neurological standpoint the history and the objective findings in this case indicated both central and peripheral involvement of a moderate degree. A few weeks after the onset of the first gastrointestinal symptoms there were muscular weakness, ataxia, and pains diffusely throughout the trunk and all four limbs, with great tenderness of the soles of the feet. There were distinct anxiety and personality changes in the acute stage, although no frank psychosis occurred.

The question arose of differentiating between thallium poisoning and other conditions, particularly multiple sclerosis, which might produce a similar neurological picture, A lumbar puncture was done. The initial cerebrospinal-fluid pressure was 110 mm. of water, the Queckenstedt test was negative, and the fluid contained 5 cells, 27.2 mgm. of protein per 100 c.c. The spinal-fluid Wassermann reaction was negative and the colloidal gold curve 444,444,321,0. The question of multiple sclerosis was of course not ruled out

by these findings. However, in view of the history, the apparent regression rather than progression of the neurological symptoms since the onset four years previously, and the clinical picture suggesting the residuals of both peripheral and central-nervous-system damage at a prior date, he concurred with Dr. Rudolphy in his opinion that thallotoxicosis was the primary condition.

Reports of the cerebrospinal-fluid findings in other cases of thallium poisoning after the subsidence of the acute stage seemed to be meager. Mahoney (Mahoney, W., Retrobulbar neuritis due to thallium poisoning from depilatory cream. Jour. Amer. Med. Assoc., 1932, v. 96, Feb. 20, pp. 618-620), reported that all the laboratory findings were entirely within normal limits in his three cases, which were studied respectively 14, 3, and 5 months after the onset of the acute symptoms. He knew of no other reports in which it was implied that any cerebrospinal-fluid studies had been done after the acute stages. The gold curve in this case of Dr. Rudolphy was interesting because it was of the type found in multiple sclerosis, though, of course, it was seen in other conditions as well and was not diagnostic of any particular entity. Recent studies (Cove, W., Russell, C., and Harwood, R.U. Lead as a possible cause of multiple sclerosis. Arch. Neurol. and Psychiat., 1934, v. 31, February, pp. 236-269), were relative to the possible association of lead poisoning with multiple sclerosis, there being a similarity in some respects of the effects of lead and thallium intoxication and multiple sclerosis. Such a remote possibility was not supported by the neuropathological findings in cases of acute lead poisoning or of thallium poisoning, which were entirely different from the findings in multiple sclerosis, and it was not permissible, therefore, to assume at this time that any connection existed between these several conditions.

Dr. J. C. Munch said that as a result of his investigations for the Bureau of Biological Survey, United States Department of Agriculture, thallium had been introduced for use into this country on a large scale, and that he had, perhaps, been studying it in more detail than most people. Thallium was used on a large scale for the control of rodents, especially west of the Mississippi River. In early studies, it was found to be toxic, and he developed an antidote for thallium poisoning in animals. However, there had been no need to use this antidote until January, 1932, when he flew to California to assist the hospital authorities in Fresno and Tulare in the treatment of fourteen persons poisoned with thallium following the consumption of tortillas made from thallium-treated grain. Six of these patients refused treatment, and all six died; eight accepted treatment, and all eight lived. These results were just too good to be true, but they had at least confirmed the method, which had been published in the Journal of the American Medical Association.

Questions had frequently arisen regarding the origin of "Koremlu." The story was that a New York beautician wanted to prepare a depilatory. In conference with her family physician, she was told of studies made by Saboraud some twenty years ago, in which he found that the application of an ointment containing a percent of thallium acetate in amounts the size of a grain of wheat daily, under strict medical supervision, might prove effective in removing superfluous hair. Because of the danger of the treatment, however, he subsequently abandoned this preparation. Proceeding on such information, Koremlu was prepared to contain from 3 to 7.5 per cent of thallium acetate, with the recommendation that it be applied freely as a cold cream at night, and used indiscriminately for a period of at least a year. In his paper on "Human Thallotoxicosis," published in the Journal of the A.M.A., he had listed fifty-one women who developed symptoms of thallium poisoning following such use, and he was sure there must be many other women similarly afflicted, whose ailment had not been diagnosed. About one third of these had shown progressive retrobulbar neuritis. They were still uncertain as to the prognosis, although he was informed

that there had been some remission of effect in some of the patients.

Dr. William Zentmayer said that animal experimentation appeared to have given contradictory results. Swab found that in rats the lens was the only structure of the eyeball not affected by thallium. Round-celled infiltration was found elsewhere in the tissues of the eye. Douski found, however, that if rats were fed thallium with their food, anterior and posterior cortical opacities appeared in the lens. If the thallium was withdrawn no further opacities developed, but those formed were pushed toward the nucleus by new-formed lens fibers. If thallium was continued total cataract resulted.

Partial detachment of the retina treated with Shahan's thermophore

Dr. H. Maxwell Langdon read a paper on this subject which was published in this Journal in June, 1935.

Discussion. Dr. Emory Hill of Richmond, Virginia, said that he had had no experience with the thermophore in retinal detachments, but had tried several other methods. The Gonin method used in a few cases was entirely unsuccessful in his hands. He did not see how the technique necessary for the successful sealing-off of a retinal tear could be carried out with this method. The Guist method had been tried by him eight times in six patients with three satisfactory results, one of which, unfortunately, was not permanent. The other two had had perfect results lasting for over two years.

The diathermy treatment had been used in his service at the Medical College of Virginia for four patients recently. The first of these had maintained a perfect result for over two months; three more recent ones were still in the hospital. Two of these appeared to be cured; the third had been operated on last week and it was at this time too soon to make any statement about the result. On leaving a patient in bed for some days a large serous detachment in a highly myopic eye had largely disappeared. This allowed for a more satisfactory study and less extensive operation. Safar needles could be used with the Walker instrument. In his last case he had made twenty-two punctures with the Walker needles and thirty with the Safar. There was surprisingly little reaction following the diathermy method. His attitude was similar to that of Dr. Holloway. For years he had declined to operate on detached retinas because he thought they presented a hopeless condition. In the last three years, however, with three successes in twelve cases, he was more optimistic.

Malignant anthrax edema

Drs. A. S. Ross and J. S. Shipman reported a case of this character which was published in this Journal in July, 1935.

Binocular color fusion in color-weak patients

Drs. W. C. Beasley, Ph.D., R. H. Peckham, Ph.D., and R. C. Moore, M.D., said that the color discrimination of 75 patients had been investigated. None of these patients had shown previous symptoms of color weakness. Eighty-seven per cent showed some weakness under the sensitive test conditions. The ability of these patients to fuse two macular-sized colored spots in the stereoscope indicated that 48 per cent were able to fuse some of the colors, 15 per cent might have fused them without experimental proof, and 37 per cent might not have fused the colors. In this manner it was demonstrated that some color fusion was possible.

The distribution of the data indicated a tetrachromatic two-process color theory, not a three-color theory. These colors were paired as follows: red-green and yellow-blue. The greatest weaknesses were found in the red and green. Munsell colored papers were used; the representative colors were listed in the Munsell Color Atlas as RPR, GBG YGY and PPB. The existence of binocular color fusion, under the test conditions, required an acceptable color theory to include some central mechanism for the fusion. Purely retinal theories became inadequate to explain the data.

Fever therapy of interstitial keratitis

Drs. Joseph V. Klauder and Harold Robertson said that fever therapy of syphilis was instituted by Wagner von Jauregg, a Viennese psychiatrist. In 1917 von Jauregg reported results of treatment of patients with paresis by inoculation with malaria. His studies were motivated by the well-known psychiatric observation that patients with psychosis are benefited by intercurrent infection.

Fever therapy is now universally employed in treatment of neurosyphilis, especially paresis. Paresis is arrested, clinically "cured" in about 33 percent of patients inoculated with malaria, and improvement obtained in another 33 percent. Fever therapy has not been employed in treatment of other manifestations of syphilis, but has recently been utilized in therapeusis of interstitial keratitis.

Inoculation with the Spirochaeta of rat-bite fever has been used instead of malaria but has been abandoned. Different vaccines, injected intravenously, are in common use. Mixed typhoid and paratyphoid vaccine cause severe constitutional reactions and may be followed by serious untoward reactions. The washed flagella of typhoid bacilli known as typhoid **H** antigen induce a less violent constitutional reaction. This preparation was employed in their study. The streptobacillus of Ducrey, a preparation known as "Dmelcos" is popular in France. A preparation known as "Pyrifer" is generally employed in Germany. An intravenous injection of this preparation causes fever with little constitutional reaction and is employed in ambulant patients. Other substances that have been injected to cause fever are Coley's serum, tuberculin, nuclein or sodium nucleinate, sterile milk, 2 c.c. of 2-percent suspension of sulphur in olive oil. None of these substances, however, are ideal. Fever may be produced by electrical methods, such as diathermy and conditioned air cabinets.

Heat is a spirocheticide. The virulence of Spirochaeta pallida studied in experimental rabbit syphilis is reduced when subjected to a temperature of 104°F. The thermal death point is slightly above this degree of temperature. When foreign-protein reaction is produced, in addition to fever, as, for example, by intravenous injection of typhoid vaccine, the therapeutic effect is inherent in such reaction. Intramuscular injections of sterile milk may cause disappearance of active manifestations of syphilis and may reduce to some degree a positive Wassermann reaction.

Malarial inoculation of patients with interstitial keratitis is not practical. It is not advisable to inoculate very young children; negroes are usually immune to malaria; patients inoculated require three to four weeks' hospitalization. Intravenous injections of mixed typhoid and paratyphoid vaccine, produce too severe reaction for treatment of ambulant patients. Fever therapy by electrical methods requires elaborate apparatus and trained personnel. Typhoid **H** antigen has been selected as the ideal method of fever therapy. After an intravenous injection the constitutional reaction is not pronounced so that ambulant patients may be treated.

Typhoid **H** antigen had been employed in the treatment of 30 children with active interstitial keratitis attending Wills Hospital. The youngest patient was six years of age. The injection was given intravenously starting with 1/10 c.c. and usually increased 1/10 or 1/20 c.c. at each injection, depending upon the reaction and fever produced by the previous dose. Injections were given every second or third day. One hour after the injection chill appeared, lasting usually about one-half hour, the temperature rose from 102° to 104°, becoming normal in six to eight hours. In exceptional cases the fever exceeded 104° and lasted longer than eight hours. Patients in the hospital as well as those attending the clinic were treated. No serious untoward reaction was produced. In order to obtain a good fever rise, the double-injection method was employed. At the height of the fever caused by the injection, a second injection of one half the amount was administered. This second injection was given usually two to three hours after the first. By this procedure temperature re-

action of 104° F. might be obtained. Antisyphilitic treatment was administered to all patients during the time typhoid **H** antigen was employed. Different lots of typhoid **H** antigen varied in their potency to produce reactions and different patients varied in the degree of their reactions from the same lot of vaccine.

A. G. Fewell,
Clerk.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

January 15, 1935

Dr. James J. Regan presiding

Absence of lateral movement of the eyes

Dr. William D. Rowland presented a 12-year-old boy who had been studied at the age of five years at the Children's Hospital in Boston. He was undersized and there was an apparent paralysis of both external- and internal-rectus muscles. The same condition was found to be present when the boy was examined at the Evans Memorial Hospital in 1929, and a diagnosis of probable anterior-pituitary dysfunction was made. The patient was next seen in December, 1934, with the following history: One month previously he had had an epileptic attack of five minutes' duration. Since then he had become irritable and quarrelsome, and had complained of occasional frontal headaches. The mother mentioned at this time that the patient had received a head injury at the age of one year, and also that one aunt had had epileptic attacks. The vision in each eye with +0.75 D.sph. was 20/20. The Maddox-rod test showed esophoria of 3 and right hyperphoria of 4 degrees at the near point. On rotating the eyes, the right eye lagged on looking up, both eyes were normal on looking down, and there was practically no lateral motion in either eye. The patient was able to converge as close as 6 cm. Although he was still undersized, his weight was 79 pounds and his basal metabolism within normal limits. Psychometric studies revealed him to be of normal intelligence. This examination confirmed the previous impression of anterior-pituitary dysfunction.

Discussion. Prof. A. Bielschowsky expressed the opinion that this was probably a case of congenital defect in the external recti with a suppression of the activity of the internal recti to prevent diplopia. He said that a paresis or paralysis of the external recti would always result in overconvergence.

A case of divergence paralysis, or convergence spasm

Dr. Virgil G. Casten presented a 28-year-old girl who had been seen in the clinic for the first time six months before. At that time she stated that three weeks previously, within twenty-four hours following the birth of an illegitimate child, she had developed diplopia which had persisted unchanged up to the present time. Examination showed that the diplopia was homonymous. The separation of images increased toward the mid-line, and the double images came nearer together as the eyes were rotated laterally. The muscle-fixation field was found to be normal. No limitation of either external-rectus muscle could be demonstrated. Diplopia increased for distance and decreased for near. Single vision was present at 25 cm. and then double vision set in. The following diagnoses were considered: 1. bilateral palsy of the external-rectus muscles, 2. paralysis of divergence, 3. convergence spasm. The first diagnosis was eliminated because of the normal excursions of the eye. The differential diagnosis between paralysis of divergence and convergence spasm was somewhat difficult to make because the history of sudden onset following the birth of the baby suggested the possibility of psychic trauma causing hysterical spasm of convergence. General medical, neurological, and blood examinations were negative. Visual fields were negative. The patient was still under observation.

Discussion. Prof. A. Bielschowsky thought that the case was one of spasm of convergence due to hysteria, although he stated that often a differential diagnosis between this condition

and that of paralysis of divergence was impossible to make.

Studies of blood fat in two cases of lipemia retinalis

Dr. Alexander Marble read a very interesting paper on this subject.

Congenital and acquired anomalies in fusion

Professor A. Bielschowsky read a very interesting paper on this subject which will be published in this Journal. It was discussed by Drs. Lancaster, Greenwood, Verhoeff, and others.

Trygve Gundersen,
Recorder.

COLORADO OPHTHALMOLOGICAL SOCIETY

January 19, 1935

Dr. Edward Jackson presiding

Uveitis and periphlebitis, probably tuberculous

Dr. W. A. Ohmart presented the case of Mr. L. H. H., aged 30 years, a medical student, who complained that on August 1, 1934, the vision of the right eye had become cloudy. He had had the usual childhood diseases with partial paralysis of the throat following diphtheria which recovered in about eight months. He had worn glasses since 1922. The vision was, O.D. 0.2, and O.S. normal.

Examination disclosed no abnormality in the left eye. In the right eye, the aqueous was turbid and there were many gray deposits of exudate on the posterior surface of the cornea. The tension was normal. There was also some vitreous haze. Several small lesions involving the choroid, well forward on the temporal side, were pigmented with rather sharp outlines. There were a few white brilliant dots in the macular region. Perivascular sheathing of the retinal veins extending into the periphery was seen.

General examination revealed no pathology. X ray of the chest was negative; there was no familial tuberculosis. Appendectomy had been performed in 1918, and tonsillectomy in 1922. The prostate was normal. The blood Wassermann and Eagle tests were negative. X ray of the sinuses revealed cloudy antra. There was a positive local reaction to 1/10,000 mg. of O.T. Therapeutic injections of B.E. were begun with 1/1,000,000 mg. on October 30, 1934. Injections were given twice a week, until at the time of presenting 8/10,000 mg. had been reached, which had given a local, but not focal reaction. The usual treatment with atropine, and so forth, was being used, but no change in the eye had yet been noted.

Discussion. Dr. E. B. Swerdfeger said that the nares were congested and the antra involved. Dowling packs and diathermy had reduced the nasal congestion, but there had been little change in the sinusitis. He asked for opinions regarding the advisability of surgical treatment for the sinusitis.

Dr. W. M. Bane said that in general, one should be conservative with sinus surgery, but the antra were very accessible and easily approached without much danger of acute exacerbation of the ocular lesions. He advised surgery in this case.

Dr. W. H. Crisp asked if other types of foreign-protein therapy and heliotherapy might not be of benefit. He strongly advised rest in bed for this patient.

Dr. G. H. Stine said that he thought diagnosis of tuberculous uveitis and periphlebitis was the correct one, and advised continued cautious use of tuberculin. He was of the opinion that severe reactions from foreign-protein therapy might not always be of benefit, and cited a case of low-grade chronic anterior choroiditis associated with chronic pansinusitis and polypoid degeneration in which retinal detachment followed the day after a severe reaction from an intravenous injection of typhoid vaccine.

Dr. W. A. Ohmart said that no benefit had been noted in this case following intravenous use of typhoid vaccine.

Gonorrheal ophthalmia in an adult; rapid recovery

Dr. R. W. Danielson reported the case of a young man who had called one

evening saying that he had had a slight discharge from one eye for about five hours. This had followed exposure to gonorrhea twenty-four and forty-eight hours previously. Examination revealed a slight mucopurulent discharge on the lower lid and only a slight redness and swelling of the conjunctiva. A smear was examined by a clinical pathologist who pronounced it positive for gonococci, but he added that the organism seemed smaller than the average.

The patient was immediately admitted to the hospital and the usual treatment of one-per-cent silver nitrate (three times in the first twenty-four hours), boric irrigations, cold applications, argyrol and mercurochrome, and protection of the other eye was carried out. Another smear made at the hospital was again reported definitely positive for gonococci by another reputable pathologist. At the end of twenty-four hours the discharge was much less, although there was considerable swelling of the lid and conjunctiva. At the end of forty-eight hours the discharge was so slight that a smear was obtained with difficulty, and was reported negative for organisms. By the end of four days the signs had all so completely subsided that the eye appeared normal. No genital manifestation appeared (he had used a prophylactic).

Dr. Danielson attributed the prompt recovery to the early recognition of the condition, to prompt care (especially the silver nitrate), and to a low virulence of the organism.

Multiple foreign bodies, keratitis

Dr. F. R. Spencer reported the case of a coal miner, aged 38 years, who had been injured by a premature explosion of black powder in a coal mine, October 18, 1934. Many fine particles of coal dust had been blasted into the skin of the forehead, face, chin, neck, eyelids, and globes. Literally hundreds of pieces of fine coal had been removed. Keratitis had progressed in the right eye, and subsided in the left. Large doses of atropine were required to maintain mydriasis. The fundus details were dim and, owing to photophobia, it was almost impossible to determine the visual acuity. X rays of the globe were negative for foreign bodies. The blood Wassermann was negative and the nasal sinuses were normal.

Discussion. Dr. Melville Black suggester one subconjunctival injection of thirty minims of 1:5000 mercury oxycyanide.

Dr. W. H. Crisp advised foreign-protein therapy, especially intravenous typhoid vaccine and suggested the wearing of contact glasses to protect the cornea.

Dr. E. R. Neeper suggested the use of Brook's hemo-protein.

Dr. G. H. Stine cited Cowan's report on the beneficial effects of Pregl's solution injected subconjunctivally.

George H. Stine,
Recorder.

LOS ANGELES SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

February 25, 1935

Dr. Walter Crane, president

Retinal detachment

Dr. Clifford Walker demonstrated four cases of detachment of the retina in which he had operated in accordance with his diathermy micropuncture technique and with the following visual results: Case 1. form perception, Case 2. counts fingers at two feet, Case 3. 20/200, Case 4. light perception only (postoperative cataract).

He stated that he preferred to use single pins, as it allowed him to place them all without any loss of fluid. After they had all been placed, he trephined the sclera and allowed the fluid to escape. Multiple punctures were made in the area of the tear.

Retinal detachment

Dr. Jewell Smith presented the case of a 33-year-old Mexican woman who, during a pregnancy with eclampsia, had what was diagnosed as bilateral retinal detachment which cleared up spontaneously after palliative treatment.

Discussion. Dr. W. A. Boyce questioned the nature of the condition, ask-

ing how it was differentiated from detachment of the choroid.

Dr. Clifford Walker stated that it was his belief that these cases were true retinal detachments due to serous exudate.

Ectropion

Dr. Helen Preston presented a Mexican girl with a facial palsy and paralytic ectropion who had been operated on by herself and Dr. Endres. A sling of fascia lata was inserted into a tunnel beneath the skin, and the ends of the transplant sewed to the medial and lateral palpebral ligaments. Perfect apposition of the lower lid was obtained.

Choroidal epithelioma

Dr. M. Beigelman presented a case of epithelioma of the choroid. This patient first came to the hospital and the diagnosis of detachment of the retina was made. Not wishing surgery the man was dismissed. Later he returned with an acute glaucoma in the same eye for which iridectomy was done without result. The eye was enucleated and the tumor found after sectioning of the globe.

Harold F. Whalman,
Recorder.

WASHINGTON, D.C., OPHTHALMOLOGICAL SOCIETY

March 7, 1935

Dr. William Thornwall Davis, president

Ophthalmic surgery

Dr. Emory Hill of Richmond, Virginia, the guest speaker of the evening, delivered a review of the ophthalmic surgery done by the staff of the Department of Ophthalmology, Medical College of Virginia, in the calendar year 1934.

There were 239 operations. In the largest group were 64 senile cataract extractions; these were discussed with reference to the technique (akinesia, deep orbital injection of novocaine and adrenalin, and the Knapp method, which was regarded as most satisfactory for both intracapsular and extracapsular extraction). In the next largest group were 38 operations for various types of glaucoma, basal iridectomy being performed for acute cases, trephining for the majority of subacute and chronic cases and various other operations for occasional cases. Twenty-four enucleations were done, and bone spheres implanted in most instances. These were regarded as the most satisfactory implants. Nine squint operations were recorded, with special preference given to the Jameson recession. Four diathermy operations were performed for detached retina, with three successful results.

It was suggested that similar reports of the experiences of clinics in various cities might serve for comparison and mutual instruction.

Discussion. Dr. John Burke said that as to taking smears and cultures preceding operation, he felt that it was perfectly safe to operate if the eye looked clean, despite the pathologist's report that bacteria and pus cells might be present. So far he had had no cause for regret on this score. He said that Dr. Hill spoke of not dressing the eye after cataract extraction until the third or fourth day. He felt that it was better, particularly if there was any traumatism, and in old people, to dress the eye on the first day, for the purpose of instilling atropine. If there was traumatism and one waited until the third or fourth day there might by that time be a posterior synechia.

He said that the subject of focal infection was of great importance and any foci of infection should be promptly eliminated before operation because of the danger of iridocyclitis.

Colonel Goldthwaite said that at the Army Medical Center, Knapp's method with forceps in intracapsular operation was used. So far, the intraorbital injection of novocaine and adrenalin preceding operation had not been the custom but he thought that it was very valuable, particularly in unruly patients.

Exophthalmos of nasal origin

Dr. W. H. Jenkins presented a paper on six cases of this condition. In all of

these cases the causative infection in the sinuses was not evident on routine examinations. In three of them the diagnosis could not be established until repeated examinations had been made. One case, resulting from a mild sphenoid infection, produced a picture very similar to that seen in cavernous-sinus thrombosis.

In this small group, complete restoration of function was brought about in each instance without resorting to any radical surgical procedures. Since in five of the six cases local treatment alone gave complete and permanent relief, it seemed obvious that radical sinus surgery would rarely be necessary if the condition were diagnosed and proper nasal treatment instituted before the formation of a true orbital abscess.

Discussion. Dr. William T. Davis said that he had seen quite a few cases of this type. The fact that there was no obvious sinus involvement was very characteristic. The patient might give no history of a cold or nasal involvement but would have sudden edema of the lids. There would be no pain and no other symptoms, except proptosis and mild discomfort. The sinuses might appear to be normal and yet one was certain the cause lay there, and further investigation would reveal this to be true.

Optic atrophy

Dr. Frank Costenbader presented a case of bilateral optic atrophy in a young colored girl, aged 12 years. The patient suffered a rapidly increasing bilateral external ophthalmoplegia, beginning with an external-rectus paresis in the left eye, progressing to a complete external ophthalmoplegia in 14 days. This was followed in a week by a complete external ophthalmoplegia of the right eye. During this period, in the space of ten days, the patient suffered a complete loss of visual field and loss of light perception in each eye. This loss seemed to progress from the left to the right until it was complete.

The patient was not ill. Examination of the fundi revealed a mild optic neuritis. A ventriculogram using thorotrast showed a defect suggestive of a tumor in the region of the ventral horn of the left lateral ventricle. Neither laboratory tests nor clinical consultations were helpful. The patient was discharged from the hospital with a total amaurosis of each eye and very little motility of either globe.

Examination three months after the onset revealed a well patient, absolutely blind, but with completely restored ocular motility. There was a well-marked secondary optic atrophy. The etiology was still in doubt but a basilar meningitis seemed probable.

Congenital entropion

Dr. William Thornwall Davis showed a case of bilateral congenital entropion of the upper lids, associated with trichiasis. A double Hotz operation had restored the lids to normal. The symptoms were entirely relieved.

James M. Greear,
Secretary.

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* Deceased.

COMBINED OPERATIONS FOR GLAUCOMA

Since the beginning of the present century there has been a remarkable increase in surgical resources for the treatment of glaucoma. At that time Graefe's iridectomy was the only major operation available for either acute glaucoma or the more definitely recognized cases of chronic simple glaucoma. A successful tonometer had not yet been invented, and it is probable that many cases of simple glaucoma were still being diagnosed as optic atrophy, without resort to miotics. The tonometer has not only refined diagnosis, it has also stimulated therapeutic and surgical development.

Applied to simple glaucoma, the results of iridectomy were usually disappointing. Holth and others have suggested that the occasional successes with this operation in the sample form of the disease were probably due to ragged performance of the iridectomy, with incarceration of iris tissue between the lips of the scleral wound.

The glaucoma surgeon of today has a choice between three widely accepted operations, which are definitely aimed at filtration of aqueous from the interior to the exterior of the eye, namely Lagrange's sclerectomy, Elliot's trephining, and Holth's (or Borthen's) iridencleisis or iridotasis. He may also fall back upon Heine's cyclodialysis, as to the exact mechanics of which there has been much discussion, but which perhaps creates a new channel of filtration between the anterior chamber and the suprachoroidal space.

Any of these operations may fail, although it may be accepted as a general rule that success is more likely to follow early than late surgical intervention.

Not infrequently it is necessary to operate upon an eye which has already been subjected to one or more operations for glaucoma or other intraocular

conditions, for example cataract; and in such cases the choice of further operation is affected by the presence of operative scars, by a coloboma of the iris, or by a desire not to interfere with whatever decompressive effect had been obtained from a previous operation.

Reports indicate that the eye is especially tolerant to cyclodialysis and to repetition of this operation; so that, while perhaps showing a less satisfactory record as to permanence than either iridencleisis or one of the forms of sclerectomy, cyclodialysis may very well be regarded as a valuable resource for supplementing the action of these other operations. Iridencleisis may be performed after iridectomy, by drawing out beneath the conjunctival flap a pillar of the iris coloboma. Iridencleisis may be repeated, or it may follow or be followed by trephining.

To make assurance doubly sure, a number of writers have recommended combination of two methods in the same operation. An early example of such combination is to be found in the addition of iridectomy to Elliot's original trephining technique. Mauksch and others have modified cyclodialisis by inclusion of uveal tissue in the operative wound; while Greenwood, after making the limbal incision for an iridencleisis, excises a small piece of sclera with punch or scissors.

In 1933 Sallmann mentioned before the Vienna Ophthalmological Society a modified form of cyclodialysis in which preliminary incision of the sclera with a lance keratome was replaced by a scleral trephining. It is now three years since the first operations by this technique were undertaken, and Sallman is able to report on a total of fifty cases so treated. (Zeitschrift für Augenheilkunde, 1935, volume 86, page 111.)

The belief that cyclodialysis, when successful, creates a filtration channel between the anterior chamber and the suprachoroidal space was supported in 1932 by Elschnig, who was able to describe histologically an eye upon which the operation had been done fourteen years earlier, and in which such a new filtration channel was present. Sallmann feels that the formation of such a channel is favored by maintaining filtration of aqueous beneath the conjunctiva for a longer period than occurs after the usual cyclodialysis operation.

Instead of the usual very short conjunctival incision, a broad conjunctival flap is made with its base toward the equator of the eye, and its apex four millimeters from the limbus; and conjunctival sutures are inserted. A 1.5 to 1.7 millimeter trephine opening is made cautiously eight millimeters from the limbus, and upon exposure of the uvea a quadrant separation of the ciliary body from the sclera is performed in the regular manner.

As after sclerocorneal trephining, the reduction of tension, readily demonstrable with the fingers, may last for weeks, the primary subconjunctival cushion of aqueous leakage sometimes containing blood from unavoidable hemorrhage into the anterior chamber.

Fifteen of Sallmann's cases of chronic glaucoma had failed to recover normal tension after repeated operations of other kinds (iridencleisis, Elliot's trephine operation, iridectomy, cyclodialysis). Of these, thirteen obtained persistently normal tension after the operation of cyclodialysis combined with trephining, and in nine of these cases normal tension had already lasted from twelve to eighteen months. In one of the two failures in this group a later Elliot trephine operation proved beneficial.

Ten eyes with chronic inflammatory glaucoma had cyclodialysis with trephining as their first operation. Seven were cured by a single operation, one after repetition of the same operation, and one after a subsequent Elliot operation. The tenth case was complicated by sympathetic ophthalmia related to a perforating injury of the other eye. Twelve out of fifteen cases of secondary glaucoma also yielded to Sallmann's combined operation.

Relapses which would not yield to medicinal treatment were exceptional, and Sallmann speaks with approval of the conclusions of Bunge, who two

years ago, in what is so far the most extensive review of cases of cyclodialysis observed for long periods of time (Klinische Monatsblätter für Augenheilkunde, 1933, volume 90, page 21), decided that the reproach frequently made against cyclodialysis as to a tendency to relapse was inaccurate, and that the lasting benefit from this operation was not less than that of Elliot's trephining.

As might be expected by analogy with Elliot's operation, Sallmann's combined technique is occasionally followed by a prolonged period of greatly subnormal tension. Exception may perhaps be offered to Sallmann's claim that the addition of scleral trephining diminishes the danger of iridodialysis as a complication of cyclodialysis, for in the classical cyclodialysis operation this complication may readily be avoided by elevating the anterior lip of the scleral wound with forceps to facilitate correct insertion of the spatula between the sclera and the ciliary body.

W. H. Crisp.

PREVENTION OF BLINDNESS

The idea that prevention is better than cure has come down to us from the time of Ovid and Livy. But in regard to blindness the modern proverb is not fully adequate. To the individual, a single drop of silver solution on each cornea at birth, as a preventive, may be worth more than all the gold that has ever been mined. The work of the ophthalmologist is largely for the prevention of blindness. That purpose should never be overlooked. It may begin with the Credé method of preventing ophthalmia neonatorum at birth; but it ends only when impending death closes the doors of sense to the external world.

An adequate definition of blindness has to recognize partial blindness. Educational blindness is vision of less than 20/70, according to the definition adopted last year by the American Medical Association. Between this and absolute blindness there is a wide gap. But prevention, looking ahead, has to keep that gap open, widen it; and not allow it to grow narrower under the exigencies of school tasks, the hardest visual tests to which most persons are destined to submit, or the incidental disabilities of children's diseases, or the minor accidents that are sure to occur to many in the course of childhood, or industrial life.

The tests that reveal "educational blindness" serve as a danger warning. They prove to the child that he cannot do all that his fellows may do with impunity. The training and supervision of sight-saving classes shows him how to make the most of the vision he has, and to avoid the danger line of blindness. The value and importance of full illumination, the dangers of continued and excessive accommodation and convergence, the risk of eye work when the powers are temporarily impaired by general disease, the common dangers of life that change partial into complete blindness, may all be brought to the attention of the child by his daily experience and instruction. This individual instruction on how to live, is real practical education for life. It is the kind of education for health that the state should furnish to its future citizens.

This kind of "state medicine" should be welcome. Some will oppose it, and talk of it as encouraging pauperism. But the whole school system, and all government, are an attempt of society to give to the individual what he cannot get for himself. Nothing that can be done for school children, can be more important than the protection of vision, on which school instruction as well as subsequent independence rests. Making the child eye conscious, and teaching him how to get the best service from his eyes are important for every child and a great contribution to the welfare of the whole community. To be impressed with the importance of vision, to know what is good vision and how it can be preserved is good education for everybody, whatever occupations may be taken up in adult life.

The ophthalmologist has an important duty to his patient, and to the public. It may require a broad view of life and social relations to understand this. But the time and effort expended for the public good will ultimately con-

tribute much to personal success and satisfaction. Educational blindness as it has been defined by the American Medical Association is more common, more remediable, and therefore more important than economic or total blindness.

Edward Jackson.

JULES GONIN

The death of Jules Gonin has removed from our midst an ophthalmologist whose name and work will not be forgotten by future generations. It was his lot to recognize that the mechanical closing of the tear in retinal detachments could cure a fair percentage of cases of this formerly absoluately hopeless condition. By this discovery an ophthalmological condition for which no remedial measures had been found was changed in its character so as to be, in favorable cases and in the hands of capable operators, one which now promises restoration of fairly useful and sometimes perfect vision in sixty to seventy percent of patients otherwise doomed to complete blindness.

After the invention of the ophthalmoscope eighty-five years ago by Helmholtz and the laying of the foundation of modern ophthalmology by Graefe, Donders and others, retinal detachment in the living eye was seen for the first time. But it took nearly twenty years before the cause of these so-called spontaneous retinal detachments was recognized. DeWecker in 1870 believed that the tear was the essential element and Theodore Leber in 1880 insisted finally on the absolute connection of tear and detachment and stated that there was no spontaneous acute retinal detachment without a previous tear or the formation of a hole. His dictum found many opponents, even among those of great repute, up to the present era. In most cases they justified their position by stating that in not every case of detachment could a hole be found and that in some cases a hole existed without a detachment. Every ophthalmologist today knows that this in great part is caused by the fact that the cases come under observation a considerable time after the detachment has taken place. The older the case the more difficult it is frequently to find the tear; the earlier, the easier; or the tear may be small and hidden by retinal folds.

In 1889 Scholer, convinced of the truth of Leber's teaching, attempted closure of the hole by chemical methods. He accomplished this in a few cases by the use of tincture of iodine but discarded the method again after some unsuccessful results. In 1902 Galezowski attempted to close the hole with a cautery; it is said, with an occasional success. Deutschmann also tried the method but both deserted it because each had his own and different conception of the genesis of detachment.

After deep and thorough study, the Swiss Gonin found the right way to the operative method. He was the first accurately to localize the hole and to perforate the sclera with the paquelin in order to close the hole. When he found a hole, could localize it, and hit it, it closed—and the retinal detachment was gone. The publication of his successes was first met with some scepticism. How often before had successful operations proved afterwards to be disappointments!

The successes however came in such rapid succession that the ophthalmological world went to Gonin and came back convinced that the closing of the retinal tear was the first essential of success. Patients were sent to him from all over Europe by men who felt that they had not yet acquired Gonin's skill in localizing the hole and in the subsequent operation. In the course of the next few years Gonin's method of operating was modified in many respects, the details of which are familiar to us all. The principle, however, of coagulation and exudation as the first and only step to reattachment remains true today, and it is to Gonin's entire credit that, by virtue of persistent work, great care, and frequent successes, he gave us the key to the problem of restoring sight in many cases to those who, but for his work, would probably still be classed among the incurably blind. In his death, at the age of sixty-five years,

the ophthalmological world and humanity in general have lost a great man.

Hans Barkan.

BOOK NOTICES

Giza Memorial Ophthalmic Laboratory. Report for 1933. Paper, 168 pages, illustrated, Cairo, 1934. Schindler's Press. (See also issue for May, 1935 p. 475.)

Ophthalmological Society of Egypt, Session 31, 1934, Bulletin. Paper, 176 pages, illustrated, Cairo 1934. Published by the Society. A. F. El-Tobgy, Honorary Secretary.

The Giza Laboratory, across the river from Cairo, is a scientific center of Egypt. Here pathologic specimens are received and examined for the 43 permanent, and 14 traveling, hospitals of Egypt. The Ophthalmological Society of Egypt meets here; post-graduate instruction is given here. Classes of 22 and 25 doctors attended the lectures in April and October, 1933; and workers from the Rockefeller Institute, New York, and visitors from London and Edinburgh came with their problems to carry on scientific investigations.

The Director of the Laboratory is Dr. Rowland P. Wilson, who visited America in 1931, and the pathologist is Major F. H. Stewart. Their assistants are natives of Egypt. A library and pathological museum are growing rapidly, and contributions of books are solicited.

This Report is written entirely in English. Its illustrations include 9 plates, photographs of the Laboratory, and the Giza Hospital, 3 graphs showing seasonal incidence of acute ophthalmias, and color plates showing an enormous dermolipoma of the limbus, streptothrix of the conjunctiva, onchocerciasis of the macula, one with the microfilaria in the fovea, and the other a year later, when vision was still 4/60. One plate shows the slitlamp appearances of epithelial vernal keratitis, which is often found with vernal conjunctivitis. There are 23 photomicrographs of pathologic tissues, and 8 reproductions of photographs of patients, showing rare tumors, anophthalmos, retrobulbar abscess, and oxycephaly.

Common diseases have also been treated. Trachoma has been the subject of experiments by Maj. Stewart, especially with reference to inclusion blenorrheas, and the transmission of the inclusion bodies. The seasonal incidence of gonococcus and Koch-Weeks bacillus infections are contrasted, and the transmission by flies is proved. The very close relation of bacteriology to important questions of ophthalmic practice is enforced.

The Ophthalmological Society of Egypt is striking evidence of the ability of that old country to adopt and profit by the most recent advances of western science and civilization. Of its 190 members only six appear to have been born in Europe. The volume is published in English, but it contains an 18-page report from a standing committee that is working out Arabic synonyms for the vocabulary of modern science that has arisen in European languages.

A true understanding of Western ophthalmology is also attested by the list of honorary members from whom the Egyptian members have learned modern ophthalmology, and whom they regard as revered masters. The list contains 21 names, among them MacCallan, Elliot, and Parsons of London; De Lapersonne, Morax, and Terrien of Paris; Van der Hoeve of Leiden; de Grosz of Budapest; Cosmetattos of Athens; Meller of Vienna; Elschnig of Prague; de Schweinitz of Philadelphia; and Wagenmann of Heidelberg. The list illustrates the ties of respect and friendship that make ophthalmic science truly international.

Of course, detachment of the retina and methods for its treatment have claimed the attention of the Society, 20 pages being devoted to this subject. Ocular leprosy in Egypt has 17 pages, and a dozen other topics are illustrated by interesting and remarkable cases. A series of illustrations is devoted to the histo-pathology of the lacrimal apparatus. For the general interest and information of the articles they contain, these transactions compare well with

those that report the annual meetings of other ophthalmological societies of Europe or America. The meetings of this Society, held in February or March of each year, might well be the objective for a winter trip by ophthalmologists from America. Much is to be learned from the modifications of disease to be observed in different races with widely different environment.

Edward Jackson.

Beurteilung und Behandlung der Augentuberkulose (Judgment and therapy of ocular tuberculosis). By E. Werdenberg. Paper covers, Ferdinand Enke, Stuttgart, 1935. Price M1.40.

This brochure is based on the author's experience with 1100 cases of tuberculous disease of the eye, in a mountain resort in the higher Alps.

Tuberculosis of the eye is the local phenomenon of a generalized tuberculosis; its course is unpredictable. Unless tubercle bacilli are demonstrated, the diagnosis of ocular tuberculosis remains tentative.

The book deals with the characteristics of the clinical picture, of the various forms of ocular tuberculosis, of parallelism and antagonism of the pulmonary and ocular conditions, of roentgenographic findings in 500 examinations of the lungs in oculo-tubercular patients, and of the rôle of the blood in these conditions.

As to therapy, this should be both general and local. The writer believes that the climatic (mountain) factor is essential in the cure of ocular tuberculosis, necessary to the healing of the focus, both ocular and primary, of the disease.

E. S. Buss.

The amblyopia reader. By Margaret Dobson. 93 pages, illustrated. Printed by Rembrandt Photogravure Ltd., London, 1935. Price not stated.

This book as the title indicates has for its sole purpose the development of the amblyopic eye in cases of strabismus. The method is the utilization of two colors, black and orange, in pictures and script. Ruby celluloid disc-shaped clips are supplied for covering the correction lens of the child's eye that has the better vision. Mother Goose rhymes with corresponding pictures which should be of interest to a child are employed. The size of the print to be used is determined by the visibility as tested with different-sized orange squares and black squares.

Only trial will prove the value of such a reader as this, but inasmuch as variety of subject matter for the training of squinting children is of great importance, as interest at best is soon lost, this new book can be used to advantage.

Lawrence T. Post.

Modern ophthalmic lenses and optical glass. By Theodor E. Obrig. 323 pages. The Chilton Company, Printing Division, Philadelphia, 1935. Price not stated.

This book by the secretary of Gall and Lembke, Inc. presents the subject in a simple and interesting manner. There are twenty chapters beginning with the history of glass, its manufacture, and characteristics. The bulk of the book deals with various types of lenses, their methods of action, advantages, and disadvantages. Many excellent illustrations, an adequate index, and bibliography are valuable features.

Lawrence T. Post.

OBITUARY

Jules Gonin

On June first Jules Gonin, chief of the Ophthalmic Clinic and Professor of Ophthalmology of the University of Lausanne, Switzerland, suffered a cerebral hemorrhage. Nine days later without having recovered consciousness and during the funeral services of his venerable mother he expired, at the age of sixty-five.

The activity of a busy life has ceased, but in his work Gonin left a monument of imperishable fame. It has been but rarely given even to the world's greatest geniuses to win success when defeat

had been all but universally accepted. This miracle Gonin accomplished.

In 1912 two hundred and fifty experienced ophthalmologists agreed that they had never seen an idiopathic detachment of the retina cured. This led Vail to conclude that surgical intervention in this condition was unwarranted and ineffective. The empirical methods that had been applied justified this opinion.

In 1929 Gonin at the 13th International Ophthalmological Congress, was able to report that of thirty operable cases with detachments of not longer than three weeks' standing, twenty-two were cured with restoration of sight in varying degrees; of thirty-five of longer than three months' duration, fifteen obtained complete anatomatical reattachment.

It was the work initiated by Gonin that led Gradle to say in 1934, undoubtedly expressing the accepted view of ophthalmic surgeons, that in detachment of the retina one is dealing with a hopeless disease if it be treated conservatively, the only practical hope lying in surgical intervention. If one does nothing, blindness results; if one operates, one may save sight.

It was known that occasionally a reattachment occurred spontaneously and that the separated retina in pregnancy was restored to its position when the uterus was emptied, but although nontraumatic detachment had been recognized clinically for over fifty years there has been no advance in its treatment since the early days of the ophthalmoscope. It was regarded as a condition almost wholly incurable until Gonin published his important discovery. It had been maintained by one group of surgeons, that tears in the retina were of no consequence, and by another, that they made recovery impossible. Both were found to be in error. For many years Gonin had felt assured that the rent was the cause of the detachment; that it was through this that the fluids seeped from the vitreous: that the liquid was not a choroidal exudate and that by searing the margins of the rent by thermocauterization through the sclera after minutely determining the location of the tear, the opening in the retina could be occluded with minimum disturbance to the vitreous and in a large proportion of suitable cases with a resultant reattachment. This thesis was modestly presented in 1919 in the "Correspondenz Blatt für Schweitzer Aerzte." It received little attention. He urged it again in 1921 in the "Annals d'Oculistique." He still was not heard. With impatience and characteristic energy and with documented evidence of successful cures, he spoke at the Heidelbergische Ophthalmologische Gesellschaft, but it was not until at Amsterdam at the International Congress that the importance of this discovery began to be recognized. That he himself realized its value was shown in the formal dedication of his Amsterdam paper. This was not to be taken casually as an ordinary medical report. It was the dignified record of a great discovery, his greatest offering, the summum bonum of his work. He dedicated the short paper which he read, as though it had been a volume, to the memory of his master, Professor Mark Dufour, president of the 10th International Ophthalmological Congress, the friend and first assistant of von Graefe, and Chief of the Clinic whose work and whose traditions Gonin himself was carrying on. Thus he linked his work with that of the founders of scientific ophthalmology. Then he obtained a hearing.

There was immediately an awareness as to the importance of his discovery. At once the greatest surgeons began to beat a pathway to the door of his clinic. Contributions in all languages, criticisms, modification of his appliances and of his technique, reports of successful cases and discussions as to the causes of failures, filled the ophthalmic journals. It became the most important contribution of the century.

"Have you anything further to add?" Gonin was asked at Madrid. "No," he said, "my work is done. Operations for detached retina are now successfully performed everywhere."

"Does Gonin use the newer appliances?" we inquired of Amsler, his colleague. "Yes, but he always has his

thermo-cautery ready in an emergency as the tool that best fits his hand."

There is yet much to be learned concerning the pathology, the prevention, and the treatment of this serious ocular accident, but when the history of ophthalmology is written in future years the name of Jules Gonin will loom large as one who made a great contribution to the welfare of humanity, when over *ablatio retinae* he erased the insignia, "Who enters here leaves hope behind."

Thousands who never knew Jules Gonin owe him a debt of gratitude.

To his bereaved family, his friends and colleagues from all parts of the world extend their deepest sympathy.

Park Lewis.

CORRESPONDENCE

On deepening the anterior chamber

Editor,
American Journal of Ophthalmology:

June 19, 1935.

In a communication to the American Journal of Ophthalmology (May 1935), Dr. H. J. Howard states that in cases of cataract or glaucoma in which the anterior chamber is shallow it may be deepened to any desired extent, preliminary to operation, by forcible injection of salt solution. Obviously one would desire to increase the depth of the chamber to normal. Since an additional amount of fluid can be injected into an eye only by stretching its coats and at the same time increasing the intraocular pressure, no doubt many of your readers would like to be informed by Dr. Howard whether or not he was able to accomplish the result he desired without rendering a cataractous eye glaucomatous or rupturing an eye already glaucomatous. If immediately previous to the injection the anterior chamber was evacuated while slight pressure was exerted upon the eye, probably the anterior chamber could be deepened considerably without these undesirable effects, but Dr. Howard does not state that this procedure was employed by him. As stated in a footnote in my paper on Cyclectomy (Archives of Ophthalmology, 1924, p. 230) I have had some actual experience in deepening the anterior chamber by injecting fluid into it. In the cases in which I employed this method I found it necessary to make a posterior scleral incision to permit deepening the chamber to the degree desired. Recently in one case I accidently discovered that air was superior to fluid for the injection, a fact that should have been obvious from theoretical considerations.

Very truly yours,
(Signed) F. H. Verhoeff, M.D.

Massachusetts Eye
and Ear Infirmary, Boston.

CHANGE OF DATE IN BOARD EXAMINATIONS

Because of a conflict in dates, the American Board of Ophthalmology has cancelled its examination on Tuesday, September 17, at Cincinnati. Instead there will be an examination on Monday, November 18, at St. Louis, Mo., at the time of the meeting of the Southern Medical Association.

All applications must be filed at least sixty days prior to the date of meeting.

Kindly communicate at once with the Secretary, Dr. Wm. H. Wilder, 122 S. Michigan Ave., Chicago, Ill.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy and embryology

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1. GENERAL METHODS OF DIAGNOSIS

Castroviejo, Ramon. **Goniophotography.** Amer. Jour. Ophth., 1935, v. 18, June, pp. 524-527.

Cohen, Henry. **An additional component of the convergence-accommodation reflex.** Brit. Jour. Ophth., 1935, v. 19, May, p. 267.

To convergence and pupillary contraction must be added relaxation of the levator palpebrae superioris with consequent lowering of the upper eyelid. Loss of this third component of the reflex is one of the earliest ocular signs in chronic encephalitic Parkinsonism and hyperthyroidism.

D. F. Harbridge.

Gould, W. L: **Testing the eyes of school children. A new eye test cabinet.** Arch. of Ophth., 1935, v. 13, Jan., pp. 60-64.

The portable cabinet described affords good illumination and prevents memorizing, as only one line of letters is presented at a time.

J. Hewitt Judd.

Gutman, Adolf. **The piezometer.** Trans. Ophth. Soc. United Kingdom, 1934, v. 54, p. 359.

The instrument was constructed to measure the displacement of the eyeball into the orbit with a patient in the horizontal position. It is an auxiliary apparatus for the diagnosis of retrobulbar tumors of the orbit. It aids in determination of the type of tumor tissue. (Illustrations.)

Beulah Cushman.

Kleefeld, G. **Photographs of the anterior segment of the globe by means of infrared light.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 47.

By infrared light photographs of diagnostic significance can be obtained for the anterior segment of the eyeball, even in cases where considerable opacification of the cornea is present. Two cases are reported, in one of which a round and fairly dilated iris was demonstrated behind the opaque cornea and the existence of synechiae thus excluded. (Eight photographic illustrations.)

J. B. Thomas.

Lauber, Hans. **Diagnostic and prognostic importance of ophthalmoscopy in red-free light.** Trans. Amer. Acad. Ophth. and Otolaryng., 1934, 39th meeting, p. 27.

Lauber discusses the advantages of red-free ophthalmoscopy in rendering

visible the retina and nerve fibers and minute details of vascular changes. Six cases are reported and are illustrated by beautiful and lifelike fundus pictures.
George H. Stine.

Loy, A. W. **A preliminary report upon a new instrument for the determination of depth perception.** Amer. Jour. Ophth., 1935, v. 18, May, pp. 447-450.

Luedde, W. H. **Simplified ophthalmoscope and retinoscope as an accessory to a vest-pocket flashlight.** Amer. Jour. Ophth., 1935, v. 18, May, pp. 459-460.

Magitot, A. **Clinical angioscotometry.** Ann. d'Ocul., 1935, v. 172, April, pp. 273-293.

The method of angioscotometry as introduced by John Evans is described. The scotomata outlined by this method are probably due to perivascular lymph spaces rather than to the blood vessels themselves. There are normal variations in the scotomata, apparently dependent upon sympathetic stimulation. Coughing, straining, or nasal irritation produces changes in the blind spot. This refined method of field study is very useful clinically in glaucoma, papillary edema, retinal arteriosclerosis, and detachment. Impending retinal detachment may be determined long before being demonstrated by the usual methods. In spite of the delicacy of the method, suitable field studies may be made in about ten minutes on the majority of patients. John C. Long.

Mayer, L. L. **Chronaxia and the eye.** Arch. of Ophth., 1935, v. 13, Feb., pp. 254-262.

Chronaxia is defined as the time during which a current of twice the threshold intensity (that is, twice as strong as the constant current which causes minimal stimulation) must flow to produce minimal stimulation. The chronaxia of the eye is higher than that of any other of the organs thus far studied, but the results differ considerably depending upon whether the phosphene is centered locally or peripherally. There are indications that chronaxia may give a quantitative method of practical differential diagnosis of organic lesions of the eye and of the optic pathways. J. Hewitt Judd.

Quervain, F. de. **Fixed pupillary mydriasis in diagnosis of skull and brain injuries.** Schweiz. med. Woch., 1935, Jan. 26, p. 75.

Unilateral fixed pupillary mydriasis shows severe intracranial injury on the same side. Usually in bilateral brain injury the side with the larger pupil is more injured and the dilatation is due to pressure from epidural or subdural hematoma. Bilateral fixed dilated pupils show severe bilateral peripheral or central injury and are a very unfavorable sign. Theodore M. Shapira.

Vogelsang, K. **Mechanical examination of eye tissues.** Arch. f. Augenh., 1934, v. 108, Dec., p. 714.

The author reviews the ophthalmic literature which deals with the examination of single tissues of the eye and of the eyeball as a whole from the mechanical viewpoint, as to hardness, elasticity, and impressibility. (Bibliography.) R. Grunfeld.

Wölfflin, E. **Determination of visual acuity and light sense.** Klin. M. f. Augenh., 1935, v. 94, Feb., p. 145.

Wölfflin describes his apparatus for testing vision in dark adaptation, for which he claims that it will give valuable information with regard to disturbances of the light sense and be of great prognostic importance.
C. Zimmermann.

2. THERAPEUTICS AND OPERATIONS

Cepero, G., and Comas, L. **Our electric knife in ophthalmology and cancer therapy.** Rev. Cubana Oto-Neuro-Oft., 1934, v. 3, Nov.-Dec., p. 118.

The authors' diathermy apparatus is described and illustrated. It utilizes thermionic radio tubes and the double Hartley circuit. M. Davidson.

Cordes, F. C., and Harrington, D. O. **Epinephrin bitartrate: uses other than in the treatment of glaucoma.** Amer. Jour. Ophth., 1935, v. 18, May, pp. 451-453.

Gifford, S. R. **Reaction of buffer solution and of ophthalmic drugs. A further note.** Arch. of Ophth., 1935, v. 13, Jan., pp. 78-82.

A new series of buffer solutions is obtained by adding varying amounts of a sodium carbonate solution to a boric acid and potassium chloride acid buffer solution. Indications for the use of acid and alkaline buffer solutions are given.

J. Hewitt Judd.

Howard, H. J. **A method of deepening the anterior chamber in glaucoma and cataract operations.** Amer. Jour. Ophth., 1935, v. 18, May, pp. 461-462.

Kleefeld. **Studies on mercurochrome.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 124.

After more than a year of clinical observations the author concludes that mercurochrome has the following indications: disinfection of the operative field, acute conjunctivitis (gonorrheal not observed), conjunctival wound, marginal ulcer of the cornea, and corneal ulcer with hypopyon (in addition to parenteral milk injection.) As a double stain of minute corneal lesions he suggests fluorescein followed by four-percent mercurochrome solution.

J. B. Thomas.

Linkenbach, M. **A new method of fixation of the eyeball in operations (vacuofixation).** Klin. M. f. Augenh., 1935, v. 94, April, p. 528. (Ill.)

The instrument consists of a rubber cap similar to that of an eye pipette, but with stronger walls. Under local anesthesia it is compressed and placed directly on the eyeball, and firmly fixates it. Thus it can also be used for making the ocular movements more visible (for instance in nystagmus), and for graphic registration.

C. Zimmermann.

Manes, A. J. **The dangers of the diathermic needle.** Arch. de Oft. de Buenos Aires, 1935, v. 10, Jan., p. 3.

Three cases of untoward result from the diathermic needle are reported. In one, preliminary puncture in the neighborhood of the retinal tear, for the purpose of subretinal fluid drainage and localization on the eve of a detachment operation, showed immediately a vitreous bubble near the correctly aimed puncture and on the following morning an intense iridocyclitis. In another case the López Lacarrère electrodiaphake successfully extracted a luxated lens from the vitreous but the latter showed coagulation as the needle traversed it. The result here was also a fulminating iridocyclitis necessitating enucleation. Among the possible explanations are: injury to a ciliary nerve in passing, the effect of the heat on the ciliary plexus, and coagulation of the vitreous. It is suggested that, for orientation purposes at least, only the Arruga orientation needle or the electrodes of Spinelli or Weve, which act on the scleral surface only, should be employed. In the third case a severe intractable follicular conjunctivitis was provided by the use of the diathermic needle to cure a chalazion.

M. Davidson.

Schmelzer, Hans. **Experimental observations with the specific protective and remedial agent against tuberculosis, "AO".** Graefe's Arch., 1935, v. 133, p. 539.

Arima, Aoyama and Ohnawa cultivated tubercle bacilli upon media containing soap fats. The tubercle bacilli thus grown were kept in physiological salt solution for one year in the ice-box. The author's experiments with guinea pigs showed that mild infections with tubercle bacilli of the human type could be checked by AO in a small proportion of the animals experimented upon. Clinical application appears to be justified, particularly since the remedy does no harm, at least as far as the author's experiments revealed.

H. D. Lamb.

Schujman, S., Fernandez, J. M., and Huber, E. **Ocular lepra.** Arch. de Oft. de Buenos Aires, 1934, v. 9, Nov.-Dec., p. 557.

Four years of attempts to influence ocular involvement with lepra by heliotherapy, actinotherapy (artificial and natural), chaulmoogra oil, gold salts,

and iodine compounds have been disappointing. Some favorable results have been obtained from the use of aniline dyes intravenously and subconjunctivally, and particularly from fluorescein, in relieving the acute stages of anterior segment involvement.

M. Davidson.

Smirnov, A. **Brilliant green in ophthalmology.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 245.

From the clinical histories of ninety-eight patients with blepharitis, corneal ulcer, and dacryocystitis the author concludes that brilliant green is the most effective of the remedies used in blepharitis, and that it may be used with success in corneal ulcer.

Ray K. Daily.

Szasz, A. **The effect of ergotamin upon the eye.** Arch. f. Augenh., 1934, v. 108, Nov., p. 511.

Ergotamin and adrenalin have generally the same effect upon the eye. If both are given simultaneously their characteristic actions occur in less time. Ergotamin stimulation of the sympathetic nerve endings is followed by relaxation of the sympathetic. Hence its two-phased effect upon metabolism: in the first vasoconstriction, retarded metabolism, and increased intraocular tension; in the second vasodilation, quickened metabolism, and increased permeability of the vessels. The first phase depends upon the concentration of the ergotamin. The second phase follows the first the sooner, the greater the amount of ergotamin administered.

R. Grunfeld.

Whitney, E. L. **Artificial fever therapy in the treatment of corneal ulcer and acute iritis.** Jour. Amer. Med. Assoc., 1935, v. 194, May 18, p. 1794.

Eight cases of corneal ulcer and six cases of acute iritis were treated by artificial fever. The usual local treatment was also used, but nonspecific protein therapy was purposely omitted. Prompt healing of some corneal ulcers after fever therapy was found to be a striking fact, and healing was hastened when local measures seemed to be making little progress, particularly in cases in which systemic stimulation was indicated. Artificial fever therapy is also of definite value in acute iritis, recovery being hastened. The author considers further observation to be necessary to determine the effect of preventing recurrences. The Kettering hypertherm machine was used. (Fourteen case reports.)

George H. Stine.

Wolff, Eugene. **Pulmonary embolism following ophthalmic operations.** Trans. Ophth. Soc. United Kingdom, 1934, v. 54, p. 275.

A trephine operation was done on a man of sixty-five years. The postoperative course was normal and resultant vision 6/6. He went home on the tenth day, and two days later he had pleurisy. On getting up after a week in bed, the whole lower limb immediately became swollen and edematous, due no doubt to thrombosis of the deep veins.

Beulah Cushman.

3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Alaerts. **New theory of stereoscopic vision. Dominance of peripheral points of the retina.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 114.

Patients with macular scotomas retain stereoscopic vision, whereas it is inhibited by lesions causing concentric contraction of the visual field. In the total visual field the nasal portion of one eye is superposed on the temporal portion of the other eye. The two nasal halves of the retinas, representing the ancestral or crossed bundle, by their juxtaposition give a complete visual field, and they form two-thirds of the total field. Superposed on it is a new retina of later acquisition which gives the sensation of relief or solidity. The author concludes that the essential factor for stereoscopic vision is the peripheral retina, the maculas serving as guides or indicators. The nasal part of the retina gives the idea of remoteness, the temporal that of nearness.

J. B. Thomas.

Biffis, A. **Paraboloid form of the surfaces of the crystalline lens and devia-**

tions from the conditions of the sines. Ann. di Ottal., 1935, v. 63, March, p. 192.

In a previous article (see American Journal of Ophthalmology, 1933, volume 16, page 1118) the author discussed the effect of the asphericity of the surface of the crystalline lens on spherical aberration of the convergent rays that pass paraxially through the central zone and those through the margin of the lens. He concludes that the paraboloid form of the lenticular surface causes so slight deviation in relation to the sines as to be unimportant in modifying the aplanatism of the schematic eye conforming thereto.

Park Lewis.

Canaveris, R. G. **The prescribing of spectacle frames.** Arch. de Oft. de Buenos Aires, 1934, v. 9, Oct., p. 440.

The author advocates that the essential measurements as to size of lens, centration of lens, bridge specifications, and length of temple should be noted by the ophthalmologist on his prescription, and a simplified method of notation is suggested. M. Davidson.

Corrado, A. **Hypermetropia of high degree.** Rassegna Ital. d'Ottal., 1935, v. 4, Jan.-Feb., p. 87.

Corrado discusses the rarity of high hypermetropia, reviews many of the published cases, and cites the clinical, pathogenetic, and herditary characteristics. His patient was a boy of thirteen years, brachycephalic, whose refraction, measured by the retinoscope, was seventeen diopters in each eye. The corrected vision was 3/10 in each eye. There was fairly marked and nearly concentric contraction of the visual fields. In the right eye there was an encircling of the inferior retinal vein by the corresponding branch of the artery. (Two figs.)

Eugene M. Blake.

De' Ceri, R. **Glaucoma and myopia.** Boll. d'Ocul., 1934, v. 13, July, pp. 875-927. (See Section 8, Glaucoma and ocular tension.)

Ferree, C. E., Rand G., and Lewis, E. F. **Age as an important factor in the amount of light needed by the eye.** Arch. of Ophth., 1935, v. 13, Feb., pp. 212-226.

It was found that a person of sixty-three years could be made to have the same visual acuity at 60 foot candles as a group of much younger people at 5 foot candles. A person of seventy years could be given the same acuity at 100 foot candles as a younger person at 1 foot candle. The division of workers into age groups is advised as an economic measure and as a means of giving greater visual acuity to the aged. The suggestion is made that determination of acuity at different intensities of light should be made as a part of the routine examination of presbyopics and that the information thus derived should be included with the prescription given the patient..

J. Hewitt Judd.

Galeazzi, C. **Clinical and statistical contribution to the study of simple astigmatism.** Boll. d'Ocul., 1934, v. 13, Sept., pp. 1232-1264.

Simple astigmatism was found in 22.55 percent of the refraction cases examined; 70.63 percent being hyperopic and 29.37 percent myopic. Oblique was found more prevalent in myopic cases and became more prevalent with advancing years. Astigmatism against the rule was more frequent in myopic astigmatism, and it increased with age. (Bibliography, twenty-one graphs.)

M. Lombardo.

Gasteiger, H. **Clinical observations regarding the extent of the retinal area capable of producing pupillary contractions.** Arch. f. Augenh., 1934, v. 108, Nov., p. 553.

The author determined the difference threshold with the Hess pupilloscope. From seventeen cases he deduces that not only the central area of the retina, 4 mm. in diameter, shows pupillomotor responses, but the periphery has similar qualities. Eight cases had central scotoma extending from 8 to 22°, the rest exhibited ophthalmoscopically

severe macular changes with a pupillomotor response of normal difference threshold. R. Grunfeld.

Janson, E. **Traumatic myopia.** Klin. M. f. Augenh., 1935, v. 94, April, p. 517. (See Section 16, Injuries.)

Johnson, Victor. **The physiologic optics of retinoscopy.** Arch. of Ophth., 1935, v. 13, Jan., pp. 65-70.

Previous explanations of the optical and physiologic background of retinoscopy were found to be insufficient to explain the "reversal point" and the image seen by the observer. A series of diagrams are presented to illustrate the author's analysis of these phenomena. J. Hewitt Judd.

Karbowski, M. **So-called temporal and spatial color mixtures.** Graefe's Arch., 1935, v. 133, p. 532.

For the formation of color mixtures two different theories have existed for a long time. Either two rapidly consecutive colors produce the impression of a color intermediate to the two primary colors, or this impression is brought about by the two colors falling upon immediately adjoining points of the retina, where the intervening distance is smaller than the minimum separabile. Whether mode of formation has any influence on the quality of the color mixture is so far an open question. Spatial and temporal mixing of colors is solely dependent upon whether rays of two colors fall upon the same cone or upon two immediately adjoining cones. H. D. Lamb.

Kardo-Sisoev, K. **The evolution of the visual organ and the development of refraction in animals.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 3.

After detailed description of the visual organ of the various animal species the writer points to the following general facts: The majority of animals are hypermetropic, a few are emmetropic. An evolutionary process toward emmetropia is evident in the animal scale. The larger the animal and the higher in the evolutionary scale the closer does his visual organ approach emmetropia. Myopia is found rarely, only in large animals, in some horses, and rarely in dogs; the smaller the animal the greater the hyperopia. The hyperopia is higher in the newly born and rapidly diminishes with age. The striking phenomenon is the approach to emmetropia with increase of the animal in size and intelligence. This is in accordance with the biogenetic law, according to which ontogeny runs through the philogenic stages. Ray K. Daily.

Kisin, P. **Artificial daylight in the examination with Ishihara's isochromatic plates.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 80.

Artificial daylight was obtained by means of an electric light and a colored gelatin filter. The tabulated findings in twenty-four persons with defective color vision, tested in daylight, in artificial daylight, and in ordinary artificial light show that sensitiveness to these plates falls in artificial illumination and is restored in artificial daylight. This study demonstrated the necessity and possibility of providing proper illumination for testing color sense. Ray K. Daily.

Krämer, Richard. **Remarks on the so-called velonoskiaskopy of Trantas.** Zeit. f. Augenh., 1935, v. 85, March, p. 300.

The author points out that the method advocated by Trantas was not new with him. It had been carefully worked out in every detail by Holth and described in the literature. Holth called the method kineskiaskopy. That priority belongs to Holth is shown by detailed history of the appearance of the method in society meetings and journals. Lindner's modification wherein he chooses only one characteristic—namely, the proportion of the width of the shadow to the degree of ametropia—as a subjective check on his cylinder retinoscopy is new and also useful. F. Herbert Haessler.

Lampis, E. **Entoptic pupilloscopy.** Boll. d'Ocul., 1934, v. 13, Nov., pp. 1492-1504.

Reverting to a study published in 1923 regarding entoptic phenomena,

the writer now describes a method for entoptic perception of the pupil, and describes the pupillary changes resulting from different luminous stimuli, as well as in the acts of accommodation and convergence. (Bibliography.)

M. Lombardo.

Law, F. W. **Calcium and parathyroid therapy in progressive myopia.** Trans. Ophth. Soc. United Kingdom, 1934, v. 54, p. 281.

Twenty-seven progressive myopes of ages six to fourteen years were studied and graphs were made of the myopia over a period of at least a year before the use of calcium and parathyroid tablets twice daily for a year. Of seventeen patients who satisfied all conditions, thirteen showed definite beneficial effects from the taking of the drugs, and four gave negative results.

Beulah Cushman.

Luckiesh, M., and Moss, F. K. **Reflex effects from critical seeing.** Amer. Jour. Ophth., 1935, v. 18, June, pp. 527-531.

Marshall, C. R. **Entoptic phenomena associated with the retina.** Brit. Jour. Ophth., 1935, v. 19, April, p. 177.

The author discusses the retinal vessels and macula, choriocapillary circulation, retinal pigment, luminous darting points, pressure phosphenes, self-light of the eye, and the seat of vision for form; and he comments on the literature of entoptic phenomena. All are summarized as follows: The rods and foveal cones can look backward and observe the retinal pigment and choriocapillary circulation. On rare occasions the retinal pigment may be seen under high magnifications. The outer segment is regarded as the seat of transformation of light energy to nervous excitation. Darting luminous points are attributed to red blood corpuscles in the capillaries of the inner nuclear layer. Self-light of the eye is probably associated with energy emanating from the pigment particles of the retina and from the retroretinal circulation. Most unexplained entoptic appearances associated with the retina, not including those which may be due to or influenced by mentality, are attributed to out-of-focus presentations on normal structures in or adjoining the retina.

D. F. Harbridge.

Motolese, A. **New contribution to the surgical treatment of high myopia.** Boll. d'Ocul., 1934, v. 13, Oct., pp. 1289-1308.

Four patients between seventeen and forty years with myopia ranging from 16 to 45 D. were operated upon by large deep discission, followed a few days later by aspiration of the opaque lens material. Tables show the changes of refraction in operated eyes whose previous myopia had been from 21 to 30 D.

M. Lombardo.

Pflugk, Albert. **New methods in investigation of the theory of accommodation.** Communication 5 (last). **The vitreous in the accommodating eye.** Graefe's Arch., 1935, v. 133, p. 545.

In eyes of horse, calf, cattle, pig, and sheep, removed at the city slaughterhouse, the vitreous was freely exposed by making a window 12 by 15 mm. in sclera, choroid, and retina. If pressure was exerted upon the region of the ciliary muscle (but not on the anterior or posterior pole of the eye) a drop of colored solution injected into the top of the vitreous between the lens and ciliary muscle could be observed moving toward the posterior lens capsule. Since the elongation of the lens axis when the eye is focused for near reading amounts only to about 0.1 to 0.15 mm., the change in the shape of the lens from pressure of the vitreous, as maintained by the author appears to be sufficiently confirmed. Vitreous and lens are equally important in production of the accommodative changes of form. The hereditary factor in myopia is a congenital inferiority of the vitreous which forces the muscles of accommodation (particularly Brücke's portion) to exceptional strain which in turn leads to abnormal stretching of the eyeball.

H. D. Lamb.

Rabkin, E. **The first Russian editor of Stilling's plates.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 232.

This is a comparison of the Russian and German editions, for the purpose of improvement in the next edition.
Ray K. Daily.

Rabkin, E., and Sarezkaja, P. **A study in color vision. The identity of two editions of Stilling's isochromatic plates (18th German and 1st Russian).** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 235.

This is a detailed report of examination of 386 persons with the two editions. Ray K. Daily.

Schmidt, J. **Exhaustion of the color system in normal trichomates.** Klin. M. f. Augenh., 1935, v. 94, April, p. 433.

Ordinarily, so-called exhaustion (alteration) of the color system is found only in a part of the anomalous trichomates. Schmidt observed this also in ten persons who in the unfatigued neutral condition had to be designated as normal trichomates. With regard to railway requirements she doubts whether such intensely variable normal trichomates should be considered as color-efficient. C. Zimmermann.

Ten Doesschate, G. **The impression of parallelism.** Klin. M. f. Augenh., 1935, v. 94, April, p. 477. (Ill.)

The author describes his experiments, which show that the impression of parallelism fluctuates considerably if two really parallel lines are viewed from different standpoints. He gives his explanation. C. Zimmermann.

Velhagen, Karl, Jr. **The cyclopic eye as basic impression.** Klin. M. f. Augenh., 1935, v. 94, April, p. 540.

When the author held a napkin ring before his eye like a monocle, his two children aged five and four years tried to imitate him, but always placed the ring between the eyes, at the root of the nose. He thinks the child, unprejudiced by experience, reacts to the impression of monocular cyclopic vision.
C. Zimmermann.

Venco, L. **A study on monolateral myopia.** Ann. di Ottal., 1935, v. 63, Feb., p. 127, and March, p. 161.

After reviewing the literature the author considers statistics recorded in the Royal Ophthalmic Clinic of Pavia between 1890 and 1933. He regards congenital predisposition as of primary importance. In many instances ophthalmoscopic study will indicate structural changes of a myopic type even in the emmetropic eye. The author advises full refractive correction except in the most extreme cases. (Bibliography.)
Park Lewis.

Weinhold, M. **A sighting aid for hunters.** Klin. M. f. Augenh., 1935, v. 94, March, p. 372. (Ill.)

The instrument consists of a black disc of the size of a trial case lens, the lower part of which is cut out, while the upper nasal quadrant has a few stenopeic holes through which the hunter sights. It comes as a monocle or it may be inserted into an empty spectacle frame or placed behind a spectacle lens. It has proved helpful not only to presbyopic but also to youthful hunters. C. Zimmermann.

Zingale, S. **Hyperplasia of the conjunctiva from errors of refraction.** Rassegna Ital. d'Ottal., 1935, v. 4, Jan.-Feb., p. 108. (See Section 5, Conjunctiva.)

4. OCULAR MOVEMENTS

Beliaev, I. **Muscle transplantation in strabismus.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 129.

The author describes his modification of the suture in the Prince advancement operation, and reports three cases of transplantation of the outer halves of the vertical recti into a paralyzed externus, with correction of the deviation, elimination of diplopia, and functional restoration. Ray K. Daily.

Bielschowsky, Alfred. **Lectures on motor anomalies of the eyes. 2. Paralysis of individual eye muscles.** Arch. of Ophth., 1935, v. 13, Jan., pp. 33-59.

Anomalous positions of rest modify the paretic deviation and confuse diagnosis. The importance of the binocular field of fixation in diagnosis is stressed. The author discusses the findings under

the headings of abducens nerve paralysis, trochlear nerve paralysis, oculomotor nerve paralysis, retraction movements, pseudo-Graefe phenomenon, and cyclic oculomotor nerve paralysis. (Photographs, drawings.)

J. Hewitt Judd.

Bielschowsky, A. **The influence of exophthalmos on the function of paretic ocular muscles.** Amer. Jour. Ophth., 1935, v. 18, June, pp. 503-507.

Bromwell, Edwin. **Upon leaking aneurisms of the cerebral arteries as a cause of third nerve paralysis.** Trans. Ophth. Soc. United Kingdom, 1934, v. 54, p. 205.

The case presented suggests (a) that when an isolated third nerve paralysis develops suddenly with pain in the region of the eye the diagnosis of a leaking aneurism should be considered; (b) that neck rigidity may be an important sign of localized hemorrhage at the base of the brain; (c) that absence of blood or xanthochromia in the cerebrospinal fluid does not exclude this possibility; (d) that trauma may determine leakage from or rupture of an aneurism which had previously given rise to no symptoms; (e) that aneurism of the cerebral arteries may be demonstrated by arterial radiography; (f) that the third and sixth nerves are most frequently involved, although very rare instances of fourth and seventh nerve palsy have been described.

Beulah Cushman.

Fink, W. H., and Bryngelson, B. **The relation of strabismus to right or left sidedness.** Trans. Amer. Acad. Ophth. and Otolaryng., 1934, 39th meeting, p. 247.

This preliminary report with analysis of cases suggests a probable relationship between strabismus and the inherent sidedness of the individual. It is possible that in certain cases strabismus may be like stuttering, another manifestation of a generalized disintegration of the higher neural processes, and found in individuals who do not possess adequate maturation of the higher association areas essential for smooth functioning of sight. (Tables, discussions.)

George H. Stine.

Grant, H. W., and Knapp, F. N. **Suppression in antipathy to single vision.** Trans. Amer. Acad. Ophth. and Otolaryng., 1934, 39th meeting, p. 168.

The correction of doubtful phorias and tropias of low degree is analyzed from the standpoint of binocular single vision and suppression. Concomitant convergent strabismus is corrected more satisfactorily because strabismic and orthophoric suppression are interchangeable. In hypertropia, correction of the diplopia and not of the deviation should be the aim of the surgeon. When single vision cannot be produced by correcting the imbalance, suppression gives more satisfactory results than orthoptic training. (Bibliography, case reports, discussion.)

George H. Stine.

Haessler, F. H. **A factor in the production of divergence increase with near vision.** Amer. Jour. Ophth., 1935, v. 18, May, pp. 419-423; also Trans. Amer. Ophth. Soc., 1934, v. 32, p. 229.

Handelsman, G. **A new strabismus forceps.** Brit. Jour. Ophth., 1935, v. 19, May, p. 271.

This is a Spencer-Wells artery forceps with a much lighter shank, the jaws angled on the edge at forty-five degrees. The jaws are flexible and grooved in a direction parallel to the muscle fibers so as to avoid crushing the latter.

D. F. Harbridge.

Jameson, P. C. **Some observations as to indications for advancement and kindred operations.** Arch. of Ophth., 1935, v. 13, Jan., pp. 3-7; also Trans. Amer. Ophth. Soc., 1934, v. 32, p. 284.

The operatic procedures selected should depend upon the near point of convergence, prism screen test for excess and insufficiency, duction tests, and the condition of the muscle exposed at the time of operation. Recession should be the primary procedure in cases of spastic or tense muscles, while advancement should be the primary

procedure for weak or attenuated muscles. J. Hewitt Judd.

Moorad, P. J. **Nystagmus in infants. Report of a case of monocular horizontal type.** Arch. of Ophth., 1935, v. 13, Feb., pp. 238-246.

A girl of six months was brought into the hospital supposedly because of influenza. The family history and past history including birth were not remarkable. The mother had noted that at the age of two months the child's head began to nod and the right eye would move from side to side continuously unless the child was sleeping. At the age of four months the head nodding ceased but the right eye continued to twitch. Physical examination showed an upper respiratory condition to be present. Neurologic examination, except for unilateral horizontal nystagmus, was negative. Ophthalmoscopic examination was also negative. At the age of seven months ten drops of three percent homatropin were put in each eye in order to dilate them for examination, which again proved negative. A few days later the rate of nystagmus became slower. It ceased entirely in three days and has not returned. No explanation is given for the cessation of the nystagmus. J. Hewitt Judd.

Pollock, W. B. I. **The technique of advancement and of tendon lengthening in strabismus operations.** Brit. Jour. Ophth., 1935, v. 19, May, p. 268.

The author uses a clove-hitch to attach the stitch to the rectus muscle for advancement operations. Two stitches are employed. The only knot for each stitch is outside the conjunctiva. The muscle does not need to be exposed for removal of the stitch. The tendon lengthening is a modification of Bishop Harman's technique. It is performed subconjunctivally by slipping two strabismus hooks, separated 10 to 15 mm., through small openings in the conjunctiva. Two cuts are placed at one side of the tendon—one in front of the anterior hook and one behind the posterior. The intervening cut on the opposite side of the tendon is done between the two hooks. No conjunctival sutures are required.

D. F. Harbridge.

Prangen, A. DeH. **Surgery of the rectus muscles of the eye: selection of operative procedures by differential diagnosis.** Amer. Jour. Ophth., 1935, v. 18, Feb., pp. 151-156; also Trans. Amer. Ophth. Soc., 1934, v. 32, p. 273.

Roelofs, C. O. **Geometric considerations regarding the movements of the eyes.** Arch. f. Augenh., 1934, v. 108, Dec., p. 631.

The author resolves the movements of the eyeball into a system of coordinates and analyzes the movements on the basis of spherical trigonometry. (Nineteen figures.) R. Grunfeld.

Verhoeff, F. H. **A new theory of binocular vision.** Arch. of Ophth., 1935, v. 13, Feb., pp. 151-175.

In bringing forward a new concept of binocular vision the author has discarded the term fusion for the term unification. He believes that binocular vision is carried out by processes that act in at least two levels. The subconscious level may lie in the occipital lobes of the brain where images are represented separately but not consciously recognized. The conscious level may be located in one or both of the frontal lobes where there is only one area for each pair of corresponding images. The parts of the two corresponding images that occupy this single area at a given time are, according to his theory, determined by a process of replacement and controlled by the attention. The terms "suppression" and "fusion" are thought to be misnomers. The term "reciprocating replacement" is said to be more descriptive than "rivalry." Binocular luster, flicker, and mixture of colors are discussed. J. Hewitt Judd.

Weed, H. M. **Divergence paralysis due to head injury.** Trans. Amer. Acad. Ophth. and Otolaryng., 1934, 39th meeting, p. 189.

The author reports four cases of divergence paralysis due to trauma,

which in itself is interesting because of the sixty cases already reported injury was the cause in only one. (Bibliography, discussion.) George H. Stine.

Wheeler, J. M. **Advancement of the superior oblique and inferior oblique ocular muscles.** Amer. Jour. Ophth., 1935, v. 18, Jan., pp. 1-5; also Trans. Amer. Ophth. Soc., 1934, v. 32, p. 237.

Zeiss, Erich. **An apparatus for photographic registration of disturbances of eye movements.** Arch. f. Augenh., 1934, v. 108, Dec. p. 674.

The author calls his apparatus a projection coordimeter. It is built upon the principle of color haploscopy. With the aid of two mirrors, red and green test objects are projected upon a screen. One mirror is handled by the examiner, while the second mirror is handled by the patient. The test objects are simultaneously reflected back into a photographic camera. The examination takes place in a dark room. The patient wears green and red glasses, and he is urged to cover the projected red test object with a green object by handling the mirror. Though it will seem to the patient that the two objects are made to coincide in reality they will be found separated. This relationship is photographed, and the procedure repeated in all the nine directions of gaze.

R. Grunfeld.

5. CONJUNCTIVA

Barrada, M. A. **Notes on avascular keratitis and argyrosis of the conjunctiva.** Bull. Ophth. Soc. of Egypt, 1934, v. 27, p. 57.

Three cases of avascular keratitis are briefly reported, and the author comments on the necessity of careful differentiation between this condition and corneal nebula, leucoma, or pannus in view of the prevalence of trachoma in Egypt. He also remarks upon the frequency with which trachoma is blamed for lacrimation, consequent treatment with silver nitrate often resulting in argyrosis. He states that ninety percent of cases of argyrosis are misdiagnosed obstruction of the lacrimal passages. Edna M. Reynolds.

Bencini, A. **"Benign" tuberculosis of the conjunctiva.** Boll. d'Ocul., 1934, v. 13, Nov., pp. 1413-1424.

A girl of sixteen years had conjunctivitis in the left eye, with five small round grayish-red nodular formations on the external third of the upper palpebral conjunctiva. Positive Pirquet and intradermal tests, positive bacteriologic examination of the conjunctival secretion, biologic test in rabbits, and the microscopic study of a nodule pointed to tuberculous conjunctivitis. The ocular lesion recovered under proper treatment. (Bibliography, two figures.) M. Lombardo.

Benoit, Maurice. **A case of nondiphtheric pseudomembranous conjunctivitis accompanied by a buccopharyngeal eruption.** Ann. d.Ocul., 1935, v. 172, March, pp. 222-225.

Severe pseudomembranous conjunctivitis in a man of thirty-one years appeared during an acute febrile condition associated with buccopharyngeal and cutaneous eruptions. Complete bacteriologic examinations of the false membranes revealed no organisms, and no cause for the conditions was discovered. Recovery was complete.

John C. Long.

Bland, P. B., and Castallo, M. A. **Instruments to facilitate the instillation of prophylactic medication of the newborn.** Jour. Amer. Med. Assoc., 1935, v. 104, March 23, p. 997.

The occasional development of ophthalmia in the new-born is probably not due to omission of the conventional prophylactic measures but rather to faulty instillation of the bactericide. Two specula are described by which the eyelids may be gently separated and the conjunctival sac thoroughly exposed. (Two figures.)

George H. Stine.

Brecher, J. **Immenin therapy as the method of choice for trachoma and its corneal complications.** Ars Medici, 1934, v. 12, May, p. 233.

Because viper poison has a distinctly arresting influence on proliferation

of pathologically disposed cells, and bee-sting poison is very nearly related to viper poison and much easier to obtain, the author has for the past two years used bee-sting poison with a view to controlling proliferation of adenoid tissue in trachoma. At first he used direct bee stings 5 to 6 mm. from the limbus, but because of the complicated and dangerous technique he substituted subconjunctival injections of Kretschy's bee-sting poison preparation, immenin. In each of forty-two cases of trachoma with pannus he obtained absolute cures. In mixed infections, the healing is furthered by iontophoresis with zinc and copper, by optochin, or by touching with chloramin, as bee-sting poison has no influence on the common microbes.

Edna M. Reynolds.

Chronis, Panos. **Treatment of acute catarrhal conjunctivitis. (Koch-Weeks).** Klin. M. f. Augenh., 1935, v. 94, March, p. 374.

In Egypt the most dangerous type of conjunctival inflammation is that of Koch-Weeks, which is endemic and occurs epidemically every year in May, often complicated by trachoma. Most of those blind from childhood became blind from this type. Eye baths with "optarex" (a preparation containing nine miscellaneous drugs, including hamamelis) are credited with beneficial results. C. Zimmermann.

Contino, F. **Lymphangectasia hemorrhagica of the conjunctiva.** Ann. di Ottal., 1935, v. 63, April, p. 281.

Only two previous cases are on record, the first described by Leber in 1880 and the second by Zimmermann twenty years later. The changes in the bulbar conjunctiva in each instance were much the same, consisting of elevated yellowish-red cords concentrically placed at the sclerocorneal limbus. They were regarded as ectatic lymph vessels filled with blood, and Leber designated the condition as lymphangectasia hemorrhagica.

The author's case, in a woman of fifty years, developed on an old trachomatous eye with corneal pannus. While subconjunctival hemorrhages not infrequently occur from local or organic causes, hemorrhage into the lumen of the lymphatics must be dependent on an anomalous connection between them and the blood vessels.

Park Lewis.

Fine, Abraham. **Chronic unilateral hypertrophic conjunctivitis. A case for diagnosis.** Arch. of Ophth., 1935, v. 13, Feb., pp. 247-250.

A man aged thirty-two years presented marked hypertrophy of the conjunctiva of the right eye, associated with preauricular swelling. Superficial vascularization of the cornea occurred and the granulations spread from the conjunctiva over the cornea, resulting in loss of sight. The patient was syphilitic but antisyphilitic treatment was of no avail. There was a marked allergic background. Tuberculosis, tularemia, and Parinaud's conjunctivitis were excluded. Radiation gave no improvement. J. Hewitt Judd.

Galeazzi, C. **Bilateral lymphoma of the plica semilunaris.** Boll. d'Ocul., 1934, v. 13, Oct., p. 1321-1335.

A boy of sixteen years showed at the nasal side of each eye a neoformation of pink color and oval shape with a vertical diameter of 7 to 8 mm., movable on the sclera and adherent to the overlying conjunctiva. Microscopic examination showed the mass to be a lymphoma. The author thinks the neoplasm was a hyperplasia of the lymphatic tissue normally present in the plica semilunaris, resulting from stimuli of inflammatory and chemical nature under treatment for trachoma. (Bibliography.) M. Lombardo.

Goldfeder, A. **Betti's method of preoperative disinfection of the conjunctival sac.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 168.

The author reviews the literature, refers to his own very satisfactory results with two percent yellow oxide of mercury ointment, and concludes that this method of conjunctival sterilization preparatory to intraocular operations

is rapid and reliable and deserves wide acceptance. Since Betti's ointment is bactericidal for the pneumococcus and streptococcus, the author suggests investigation into its effect in purulent ulcers of the cornea.

Ray K. Daily.

Herbert, H. **Corneal pitting.** Brit. Jour. Ophth., 1935, v. 19, May, p. 261.

Commenting on the recent paper by Busacca (see American Journal of Ophthalmology, 1935, volume 18, page 389), Herbert suggests explanations for differences between the pits as seen by him in old cases of trachoma in India and in cases seen by Busacca in Brazil. A large proportion of the Indian patients had had little or no previous treatment which might have stimulated epithelial growth, while (it is suggested) the average trachoma case in Brazil is perhaps subjected to fairly early treatment. D. F. Harbridge.

Lagrange, Henri. **The pathogenic problem of so-called critical allergic conjunctivitis.** Brit. Jour. Ophth., 1935, v. 19, May, p. 241.

Endocrine disturbances, sensitization, and the syndrome of so-called critical allergic conjunctivitis are considered. Anaphylaxis, allergy, receptivity, sensitization and idiosyncrasy are defined on the basis of anaphylactic phenomena, protein shock, and colloidoclastic shock. (Bibliography.)

D. F. Harbridge.

Lanza, G. **Search for an atypical or invisible tuberculous virus in trachoma.** Rassegna Ital. d'Ottal., 1935, v. 4, Jan.-Feb., p. 58.

Lanza attempts to answer the old question whether or not trachoma is in any sense a tuberculous disease. He investigated as to a possible tuberculous bacillemia, and by bacterioscopic and cultural search for Koch's bacillus in the conjunctival material, as well as inoculation of trachomatous matter into the peritracheal lymph glands of guinea pigs. In no instance were tubercle bacilli found in the blood stream, nor did cultural methods reveal any specific virus. Inoculation was likewise negative, so that the independence of tuberculosis and trachoma is supported.

Eugene M. Blake.

Lehrfeld, L. **Limitations of silver nitrate in ophthalmia neonatorum.** Jour. Amer. Med. Assoc., 1935, v. 104, April 27, p. 1468.

The records of the department of public health of Philadelphia for the past fifteen years show that ophthalmia neonatorum has not materially decreased, despite the generalized application of Credé's method of antisepsis. Birth records of 28,000 cases were thoroughly studied and 1,500 of ophthalmia neonatorum on file were investigated. There was an incidence of 2.2 percent, and approximately 30 percent of these were gonorrheal in origin. The author recommends superficial sterilization of the birth canal of all clinic patients before delivery, particularly Negroes; thorough flushing of the eyes of the new-born with sterile boric acid solution, three ounces (90 c. c.) of solution being used for each eye, followed immediately by instillation of 0.5 percent solution of silver nitrate. This is to be repeated on three successive days, and then followed by thorough flushing with sterile boric acid solution by the attending physician daily for two weeks. Compulsory reporting of all cases of ophthalmia neonatorum and compulsory reporting of the results of treatment at the end of six weeks are requisite, as well as change in state laws to include prenatal antisepsis.

George H. Stine.

Lewkojewa, E. F. **The pathogenesis of trachoma. Cytology and histology of trachoma.** Graefe's Arch., 1935, v. 133, p. 587.

The author reiterates essentially the contention advanced by Dwykoff and himself (See American Journal of Ophthalmology, 1930, volume 13, page 1097) that trachoma, particularly in its second stage, can be differentiated cytologically in scrapings from the conjunctiva by the entire follicle consisting of very large lymphoid cells or lymphoblasts with numerous karyokinetic fig-

ures. In folliculosis, the author claims, this stage is never reached by the follicle. H. D. Lamb.

MacCallan, A. F. **Trachoma, recent advances and the principles of prophylaxis.** Brit. Jour. Ophth., 1935, v. 19, May, p. 253.

MacCallan defines trachoma as a chronic specific disease of the conjunctiva characterized by new formation of lymphoid tissue which spreads to the cornea, and is followed by cicatricial changes. Recent advances have not proved whether the condition is bacterial or a virus disease. In poor countries the issuing of zinc sulphate drops would do much to combat the ravages of acute ophthalmia. Regulation of family life is essential. International organization against trachoma is discussed. D. F. Harbridge.

McKee, S. H. **Inclusion blennorrhea.** Amer. Jour. Ophth., 1935, v. 18, Jan., pp. 36-46; also Trans. Amer. Ophth. Soc., 1934, v. 32, p. 29.

Melik-Musian, B. **Intramuscular injections of cod-liver oil in scrofulous diseases of the eye.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 136.

Forty-five cases of phlyctenular keratitis with pannus and blepharoconjunctivitis were treated with six to seven intramuscular injections of 1 gm. of cod-liver oil. The results lead the author to recommend this method in preference to the usual oral administration. Ray K. Daily.

Merrill, H. G., and Oaks, L. W. **Oculoglandular tularemia.** Amer. Jour. Ophth., 1935, v. 18, May, pp. 453-457; also Pacific Coast Oto-Ophth., 1934, 22nd meeting, p. 203.

Meyerhof, M. **On secondary follicular infection in old trachoma.** Bull. Ophth. Soc. of Egypt, v. 27, 1934, p. 52.

In two cases of old trachoma with acute follicular conjunctivitis, the course of the disease was benign though the symptoms were somewhat violent and conjunctival edema and glandular swelling lasted from four to six weeks. In a third case reinfection occurred in a completely cicatrized trachomatous conjunctiva, and the course was protracted, partial recovery requiring six months. These cases are reported by the author as proof that follicular and trachomatous conjunctivitis cannot be regarded as identical. Edna M. Reynolds.

Morris, M. C., and Julianelle, L. A. **A study of an ocular infection induced experimentally with Bacterium monocytogenes.** Amer. Jour. Ophth., 1935 v. 18, June, pp. 535-541.

Motolese, F. **Ulcer of conjunctiva with satellite polyadenitis from "streptococcus hemolyticus melanogenes."** Boll. d'Ocul., 1934, v .13, Aug., pp. 1063-1078.

A man of thirty-five years showed a painful ovoid grayish ulcer of the lower left fornix with preauricular and submaxillary adenitis and slight rise of temperature at nights. A smear from the ulcer showed the presence of the streptococcus and staphylococcus albus, and the culture in blood agar showed a black discoloration around the colonies. The general and local pathogenic action on ocular structures of rabbit and white mouse is described in detail. M. Lombardo.

Olitsky, P. K., Syverton, J. T., and Tyler, J. R. **Studies on the etiology of spontaneous conjunctival folliculosis of rabbits.** Jour. Exper. Med., 1934, v. 60 Sept. 1, p. 375.

This paper is one of a series dealing with follicular conjunctivitis in different species of animals. A new species of organism capable of reproducing follicular conjunctivitis in rabbits has been isolated from rabbit folliculosis. Although of a different species, it is of the same genus as Bacterium granulosis, which is associated with human trachoma, and Bacterium simiae, associated with follicular conjunctivitis in monkeys and chimpanzees. Edna M. Reynolds.

Rubio, J. F. **The use of silver nitrate in gonorrheal ophthalmia.** Rev. Cu-

bana Oto-Neuro-Oft., 1934, v. 3, Nov.-Dec., p. 115.

Silver nitrate is the sovereign remedy if properly used. The gonococci acquire resistance to it, however, if used continuously, and when that becomes apparent its use should be alternated with zinc sulphate for a few days. Other reasons for poor results are: reinfection from the lack of cleanliness, failure to wash out accumulated secretion before application of silver nitrate, failure of proper eversion of lids so as to reach the retrotarsal folds, and too prompt neutralization with sodium chloride for therapeutic effect. M. Davidson.

Szily. **Trachoma follicles in choroid and vitreous chamber after intraocular introduction of trachomatous material.** Klin. M. f. Augenh., 1935, v. 94, March, p. 320. (Ill.)

Further experiments on rabbits confirmed Szily's (see American Journal of Ophthalmology, 1935, volume 18, page 479) production of typical trachoma follicles in choroid and vitreous by intraocular transmission of trachomatous material. The follicles start from minute groups of lymphatic cells. Connective tissue develops in these and they ultimately attain the same size as those found in the conjunctiva after subconjunctival inoculation.

C. Zimmermann.

Yanes, T. R. **Remarks on vernal conjunctivitis.** Rev. Cubana Oto-Neuro-Oft., 1934, v. 3, Nov.-Dec., p. 132.

The possibility of a benign masked vernal conjunctivitis is to be borne in mind when astringents and antiseptics are poorly tolerated in treatment of chronic conjunctivitis. The true nature is often disclosed by finding eosinophilia in the secretion and by slitlamp examination, and obtaining relief from adrenalin and novocaine and smoked glasses. It is probable that the masked form prevails in tropical countries.

M. Davidson.

Zingale, S. **Hyperplasia of the conjunctiva from errors of refraction.** Rassegna Ital. d'Ottal., 1935, v. 4, Jan.-Feb., p. 108.

The author reviews the literature relative to conjunctival affections resulting from uncorrected errors of refraction, and discusses the differential diagnosis between this affection and other conjunctivitides. He stresses the fact that it is usually the low hypermetropic or astigmatic errors, or their combination, which lead to symptoms of conjunctivitis. He explains the hyperplasia of the conjunctiva as resulting from the fact that strain of the ciliary muscle induces vasodilatation through anastomosis of the ciliary and conjunctival vessels. It is necessary to recognize this affection from the standpoint of compulsory military service as well as for the comfort of the patient.

Eugene M. Blake.

6. CORNEA AND SCLERA

Adam, C. **Damage to the corneal epithelium by pantocaine.** Klin. M. f. Augenh., 1935, v. 94, p. 376.

Adam reports a case of corneal ulcer produced by pantocaine.

C. Zimmermann.

Adamantiadis, B. **Deep pustuliform keratitis and the different forms of parenchymatous keratitis of acquired syphilis.** Ann. d'Ocul., 1935, v. 172, April, pp. 304-311.

A case of deep pustuliform keratitis (Fuchs) is described in a man of forty-five years who had contracted syphilis six months before onset of the ocular symptoms. There was an intense yellowish infiltration of the posterior layers of the cornea, with some bulging into the anterior chamber. Some of the epithelium was lost over the infiltrated area. Hypopyon was present. There was considerable iritis and ciliary injection. Rapid improvement followed the institution of antisyphilitic therapy. The lesion did not become vascularized. Parenchymatous keratitis found in acquired syphilis may be divided into four groups: (1) diffuse inflammation of medium intensity with rapid and benign evolution; (2) punctiform keratitis of Mauthner, in which the deeper corneal layers are stippled with small grayish round spots separated by

healthy tissue; (3) circumscribed infiltration of the deper layers associated with hypopyon; (4) gumma of the cornea. These forms are usually unilateral.
John C. Long.

Barrada, M. A. **Notes on avascular keratitis and argyrosis of the conjunctiva.** Bull. Ophth. Soc. of Egypt, 1934, v. 27, p. 57. (See Section 5, Conjunctiva.)

Batignani, A. **Conjunctivitis from herpetic virus in the new-born.** Boll. d'Ocul., 1934, v. 13, Sept., pp. 1217-1220.

A girl child of six days showed a characteristic herpetic keratitis of the left eye with acute conjunctivitis, the secretion of which inoculated in the cornea of the rabbit reproduced classic herpetic keratitis in twenty-four hours. The history showed that the eye had been infected by herpetic virus during delivery. (Bibliography, one figure.)
M. Lombardo.

Biro, Emmerich. **A case of microcornea with high myopia.** Klin. M. f. Augenh., 1935, v. 94, Feb., p. 239. (Ill.)

Microcornea exists if the horizontal diameter is under 11 mm., the vertical under 10.7 mm. A man aged eighteen years, with high constantly progressive myopia from earliest childhood, and vision with —28 sph. 5/30, had large prominent typical ectasic eyeballs and flat microcorneae, 10 mm. horizontally and 10.5 mm. vertically. The flattening of the cornea probably was caused by the general intense distension of the whole globe, while the consequent axial myopia compensated or exceeded the hypermetropic refraction of the flat cornea. There were no other disturbances of development excepting a radial groove of the iris, without coloboma.
C. Zimmermann.

Busacca, Archimede. **Avascular trachomatous keratitis.** Klin. M. f. Augenh., 1935, v. 94, Feb., p. 202. (Ill.)

Busacca gives an elaborate treatise on the changes of avascular trachomatous keratitis—that is of the parts not yet reached by new-formed bloodvessels—which he attributes to direct primary localization of the trachoma virus. Peroxydate of zinc proved most beneficial in removing the acute changes in the trachomatous corneal process.
C. Zimmermann.

Buschke, W. **Deep corneal hemorrhage in sclerokeratitis.** Klin. M. f. Augenh., 1935, v. 94, Feb., p. 189. (Ill.)

A girl aged twenty-two years presented a hematoma of the deepest layers of the cornea, appearing as a dark-red point near the limbus. It came from a deep-seated, newly formed capillary in sclerosing keratitis. Its course and relatively speedy absorption could be pursued by direct microscopic observation in vivo.
C. Zimmermann.

Fazakas, Alexander. **Corneal and meibomian mycosis from acrostalagmus.** Klin. M. f. Augenh., 1935, v. 94, April, p. 514. (Ill.)

A man of thirty-nine years showed thickening of the right lower lid, especially of the intermarginal seam and at the openings of the meibomian glands, from which oozed a thin purulent secretion with yellowish gray masses, consisting of colonies of acrostalagmus cinnabarinus Corda. The lower part of the cornea presented round yellowish-gray infiltrations. Inoculations of rabbit corneas were all positive, proving that acrostalagmus is pathogenic not only for the skin but also for the cornea.
C. Zimmermann.

Filatov, B. **Remarks on corneal transplantation.** Sovietskii Viestnik Opht., 1934, v. 6, pt. 1, p. 22.

The conjunctival flap covering the transplant, the Filatov-Marzinkowsky latest type of combined corneal trephine and prophylactic spatula (a knife with blunt sides and cutting edge), and an obturator for plugging the trephine opening to check escape of vitreous are described in detail. (Illustrations.)
Ray K. Daily.

Friede, R. **A new trephine for keratoplastic operations.** Arch. f. Augenh., 1934, v. 108, Nov., p. 568.

An improvement in Hippel's trephine was made by shortening its length considerably and diminishing its weight. These changes permit better balancing of the trephine while in action.

R. Grunfeld.

Grandi, G. **Atypical nodular keratomycosis aspergillina.** Boll. d'Ocul., 1934, v. 13, Aug., pp. 1001-1015.

A man of nineteen years showed on an old corneal leukoma a large, slightly elevated, reniform neoformation of whitish-yellow color and dry and irregular surface. The new growth was of a few weeks duration and was growing rapidly. Examination of the mass showed aspergillus fumigatus. Histologic examination showed that the process had developed in the superficial corneal layers. A suspension of the spores in physiologic solution was more or less pathogenetic for the different ocular structures of the rabbit. (Bibliography, three figures.) M. Lombardo.

Herzau, Werner. **A glass suction cup for treatment of diseases of the cornea.** Klin. M. f. Augenh., 1935, v. 94, April, p. 530. (Ill.)

The round open base has the size of the cornea and the top ends in a curved glass tube to which a rubber bag is fastened. It is placed directly on the eyeball and produces intense hyperemia of the pericorneal vessels, simultaneously decreasing intraocular pressure. By stimulating corneal metabolism it exerts a favorable influence on chronic affections of the cornea, especially parenchymatous keratitis.

C. Zimmermann

Isakowitz. **Keratitis bullosa (spontaneous corneal erosion) and allergy.** Klin. M.-f. Augenh., 1935, v. 94, Feb., p. 243.

The tendency to disjunction of the epithelium seems to be a partial phenomenon of the allergic complex of symptoms. Four cases of keratitis bullosa with bronchial asthma and eczema are reported to illustrate this connection. C. Zimmermann.

Kaplan, E. B. **Multiple fractures associated with blue sclera.** Jour. Bone and Joint Surg., 1934, v. 26, July, p. 625.

In two cases of multiple fracture associated with blue sclera in girls aged eight and six years respectively, there was evidence of endocrine disturbance. In the family of one patient, it was found that in all the female members of the family the fractures ceased after normal onset of the menstrual cycle. This observation was verified by a number of cases reported in the literature. Weekly injections of ovarian extract were given to both patients, and during the period of these injections no fractures occurred. Two series of investigations were carried out in an attempt to determine whether the bluish coloration was due to increased transparency of the sclera. No change in the color of the sclera was found with contraction or dilatation of the vessels. On several occasions, the bluish color of the sclera was found to vary without apparent reason. Edna M. Reynolds.

Manes, A. J. **The problem of interstitial keratitis.** Arch. de Oft. de Buenos Aires, 1934, v. 9, Nov.-Dec., p. 549.

On the basis of a review of the literature and of four cases reported, the author concludes that treatment does not influence the evolution of heredoluetic cases; that it is sometimes observed as a complication in infectious diseases; that, while trauma is a factor in some cases, the other factors responsible for the precipitation of an attack of keratitis in hereditary lues still remain unknown, and that Igersheimer's dictum that "the exact pathogenesis of interstitial keratitis is still an enigma" remains true.

M. Davidson.

Mogan, R. F., and Baumgartner, C. J. **Menière's disease complicated by recurrent interstitial keratitis; excellent result following cervical ganglionectomy.** Western Jour. Surg. Obstet. and Gynecol., 1934, v. 42, Nov., p. 628.

Striking success followed removal of both superior cervical sympathetic ganglia. The relationship between the

keratitis and the sympathetic system has not been explained.

Papagno, M. **Polyvitaminic therapy of phlyctenular keratoconjunctivitis.** Ann. di Ottal., 1935, v. 63, April, p. 288.

According to the author the development of phlyctenules is determined by two factors, a tuberculous toxin circulating in the blood and causing an allergic reaction in the mucous membrane and skin, and an exogenous factor in the toxin of other microorganisms which may accidentally enter the conjunctival sac and penetrate the conjunctiva and corneal margin. The tissues, sensitized by the tuberculous toxin, react with infiltration of round cells to thus form the phlyctenule. Among forty-two cases examined clinically, twenty-seven cases had indicanuria, ten had active tuberculosis, four a status lymphaticus, and four eczema, while in only six could no clinically evident pathologic condition be noted. The best results were obtained from concentrated polyvitamin preparations. The author concludes that the ocular affection has a tuberculotoxic origin associated with hypovitaminosis.

Park Lewis.

Rasquin. **Trephine fistulization in the treatment of keratoconus.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 11.

A woman twenty-five years old had advanced keratoconus in the right eye, the left eye normal. A year later irregular astigmatism had begun to develop in the left eye, the vision during a period of three weeks falling from two-thirds to one-third normal. Tension was 15 mm. Schiötz. Elliot's operation was performed with a 1.5 mm. trephine, adding a peripheral iridectomy. Three years later the right eye, not subjected to operation, had vision less than 1/20. The left eye, trephined in an early stage of the disease, was almost entirely cured. Its keratoconus had yielded immediately after the operation, the irregular astigmatism had become regular, and vision had improved to two-thirds. The author suggests that the reduction of tension permits better circulation and facilitates osmosis, thus raising the vitality of the cornea.

J. B. Thomas.

Rinaldi, S. **Local action of sexual hormones on experimental septic wounds of the cornea.** Boll. d'Ocul., 1934, v. 13, Sept., pp. 1221-1231.

The author infected the corneas of normal and orchiectomized or ovariectomized rabbits with fresh culture of staphylococcus aureus; and on these and simply scarified corneas he applied an aqueous extract of the corresponding sex glands. He concludes that such extracts have no influence on the course of septic lesions of the cornea either in normal animals or in those deprived of their sex glands. (Bibliography.)

M. Lombardo.

Rohrschneider, Wilhelm. **Investigations concerning the pigment deposit in the cornea in hepatolenticular disease (Kayser-Fleischer ring).** Arch. f. Augenh., 1934, v. 108, June, p. 391.

Investigations conducted by the author prove that silver could be detected in the pigment neither chemically nor with the aid of spectroanalysis. Silver therefore, is not the cause of the pigment deposit. This is likely a derivative of hemoglobin, though all the iron reactions give negative results. Other reactions exclude lipofuscin and urobilin. The pigment resembles malaria and formalin pigment.

R. Grunfeld.

Schornstein, T. **A contribution to the innervation of the cornea of the human eye.** Arch. f. Augenh., 1934, v. 108, Dec., p. 601.

The author describes the cornea of a fifteen-year-old boy in which all the nerve fibers were medullated and therefore visible. Slitlamp study revealed that the fibers varied in size and entered at different depths, passing radially. They numbered eighty-five in the right and seventy in the left cornea. After dichotomous or trichotomous division they formed archlike anastomoses. The smaller anterior fibers were first to leave their own stroma depth and turn

toward the surface, while the thicker trunks left last and innervated the center of the corneal surface. The small fibers entering the posterior third innervated a small peripheral portion of the cornea. After the nerves left their original stroma depth they formed no more anastomoses, but divided freely like branches of a tree, and each division branched out similarly to end in the subepithelial and epithelial zones like a fine brush. R. Grunfeld.

Tichvinski, B. **Corneal sensitivity in the presence of epiphora.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 120.

The study is based on examination of 120 patients with epiphora. The sensitiveness of the cornea was tested by the touch of a hair with a pressure of 0.3 mg. per sq. mm. of surface. A count of eight sensitive points out of thirteen tested was taken for normal. The tabulated reports show that of the group with normal permeability of the lacrimal passages 16 percent had normal, 31 percent lowered, and 53 percent increased corneal sensitivity. Of the group with impaired permeability of the lacrimal passages 84 percent had lowered corneal sensitivity. The outstanding finding is the frequent occurrence of lowered corneal sensitivity in cases with obstructed lacrimal passages. Ray K. Daily.

Vasutinsky, A. **Partial corneal transplantation.** Sovietskii Viestnik Opht., 1934, v. 6, pt. 1, p. 29.

From detailed description of technique, and a detailed report of three cases, the conclusions are that the technique is not difficult and should be mastered by every ophthalmologist; that the operation is functionally and cosmetically superior to optical iridectomy; that in large leucomas the operation may be combined with an antiglaucomatous operation; that the transplant has a beneficial effect on the surrounding cornea; that good vision may be obtained in cases with extensive corneal scars; that large staphylomas contraindicate the operation, but good results may be obtained in cases of small ectasia; and that culture of corneal tissue justifies the belief that the cornea of the dead may be used for transplantation. Ray K. Daily.

Wiedersheim, O. **On rodent ulcer.** Klin. M. f. Augenh., 1935, v. 94, Feb., p. 171. (Ill.)

On the right cornea of an otherwise healthy woman aged seventy years, after influenza marginal ulcers arose, developing into a typical rodent ulcer. Five months later the left eye also became affected. For two years quiet and progressive periods alternated, and although each cornea was totally involved, terminal vision was 1/10 and 1/20. The clinical picture was characterized by irritation of the fifth nerve, as anesthesia dolorosa with necrotic nutritive disturbances, suggesting the possibility of infectious and neuropathic etiology. Hence cauterization is to be avoided. Careful abrasions, tincture of iodine, and stimulation of local and general nutrition are recommended. C. Zimmermann.

Yalour, R. R., Negri, T., and Balza, J. F. **Blastomycotic corneal ulcer.** Arch. de Oft de Buenos Aires, 1935, v. 10, Feb.-March, p. 78.

A central serpiginous ulcer in each eye appeared at an interval of a few weeks accompanied by small nodular buccal and pharyngeal lesions. From all the lesions the Monilia albicans (or Candida albicans) was isolated and cultivated. Inoculation into a rabbit's anterior chamber and veins showed virulence, but intracorneal inoculation gave a negative result. (Illustrated.) M. Davidson.

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Anelli, D. **The pupillary sphincter in the animal series.** Boll. d'Ocul., 1934, v. 13, Nov., pp. 1461-1480.

In a comparative study the writer found that the sphincter of the pupil was present in all animals with the exception of beaver and fish. In the pupillary zone of the swan and the cock only a few thin fibers exist, while in birds

the sphincter is very large, occupying three-fourths of the thickness of the iris from the pupillary almost to the ciliary margin. Pigmented cells separate the muscle fibers in the lion, while in the pig two layers of pigmented cells are found, one posterior which is and one anterior which is not found in other animals. (Bibliography.)

M. Lombardo.

Balza, J. F., and Mosto, D. **Tuberculoma of the choroid.** Arch. de Oft. de Buenos Aires, 1935, v. 10, Feb.-March, p. 84.

Tuberculoma of the choroid appeared in a woman of thirty-four years, in the last stage of acute miliary tuberculosis. It presented itself as papilledema with a tumorlike projection over the disc, covered by nontransparent retina. (Illustrated with photomicrographs of the eye, obtained at autopsy.)

M. Davidson.

Bencini, A. **Examination for tubercle bacillus in the blood by E. Löwenstein's method, in ophthalmology.** Boll. d'Ocul., 1934, v. 13, Oct., pp. 1309-1320.

In five patients affected by chronic iridocyclitis or chorioretinitis, with positive Pirquet and intradermal test for tuberculosis, Löwenstein's culture technique showed the blood negative alike for the presence of colonies in culture media and in microscopic examination of the superficial layers of the media. (Bibliography.)

M. Lombardo.

Damel, C. S. **Ossification of the choroid.** Arch. de Oft. de Buenos Aires, 1934, v. 9, Nov.-Dec., p. 512.

On the basis of seven cases the following conclusions are arrived at: Osseous metaplasia of the eye starts from choroidal connective tissue and its presence in vitreous and lens is secondary. All atrophic eyes should be x-rayed for the presence of bone and enucleated if it is found, since bone in the eye may excite sympathetic ophthalmia.

M. Davidson.

De Jaeger, A. **A case of miliary tuberculosis of the iris.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 31.

This case is reported because of its particularly favorable evolution and because the author was able to make detailed study of the tubercles with the slitlamp. (Three illustrations.)

Farina, F. **Sympathetic papilloretinitis.** Rassegna Ital. d'Ottal., 1935, v. 4, Jan.-Feb., p. 71.

Farina's patient had suffered a penetrating wound of the left eye eight years before coming under observation. Several attacks of pain and inflammation in the injured eye had subsided under empirical treatment. Several years later the patient developed in the opposite eye an optic neuritis which recurred twice. The second eye cleared up after enucleation of the injured eye, which showed most of the usual changes of sympathetic ophthalmia. All other collateral causes of optic neuritis were ruled out by careful examination. This case appears to be one of sympathetic ophthalmia without any changes in the uveal tract. Eugene M. Blake.

Fischer, F. P. **The hydrophilic properties of the uvea.** Arch. f. Augenh., 1934, v. 108, Dec., p. 693.

The author establishes the fact that all tissues of the uvea swell in water. The swelling is greatest in alkaline solution, and in acid greater than in pure water. Increased concentration of organic acid increases the swelling, while increased concentration of inorganic acid decreases the swelling. The uvea absorbs less water from salt solutions than from pure water. The swelling of the choroid increases in proportion to the concentration of the cathions, but decreases with increased concentration of sodium cathions. The opposite holds true for the iris and ciliary body. Nonconductible solutions retard the absorption of water in proportion to their concentration. The choroid has the greatest and the iris the least hydrophilic capacity and intensity. The iris contains more colloid-bound water, the ciliary body more water not bound to colloid. R. Grunfeld.

Hesse, Erich. **Free pigment bodies in the anterior chamber.** Zeit. f. Augenh., 1935, v. 86, April, p. 26.

A small discoid pigmented mass was noted in the anterior chamber of an eye as a chance finding. Its only possible clinical significance was the possibility of confusion with a foreign body. Such bodies may arise by separation of a flake of the iris or in the fetal pupillary membrane. F. Herbert Haessler.

Huber, E., and Picena, J. P. **Contribution to the study of endoocular ossification.** Arch. de Oft. de Buenos Aires, 1935, v. 10, Jan., p. 7.

Clinical and x-ray studies of nine cases of intraocular ossification, four of which were also studied histologically, lead to the following conclusions: Regardless of site and type, osseous metaplasia is always of connective tissue origin and preceded by inflammation and calcification without the intervention of cartilage formation. Roentgenologists should familiarize themselves with intraocular osseous metaplasia in order to avoid errors in interpretation of orbital films. Apart from the danger of sympathetic ophthalmia, its existence is a definite indication for enucleation of an eye.
M. Davidson.

Jaensch, P. A. **Fatty degeneration in the eye. 3. Fatty degeneration in the uvea.** Graefe's Arch., 1935, v. 133, p. 517.

Pathogenic occurrence of fat is frequently noted in the ciliary body and its processes, more rarely in the iris and choroid. In all of these it greatly resembles the physiologic fatty degeneration of old age which takes place in the walls of the arteries and arterioles; also as intracellular and extracellular fat in the stroma and as fatty degeneration of the chromatophores, epithelium, and muscle cells. Its occurrence may be due to cell necrosis or to the taking up of fat from the blood stream. Such changes may occur in the uveal tract of young children as the result of severe inflammatory processes as well as from necrotic glioma.
H. D. Lamb.

Lamb, H. D. **The pathogenesis of some intraocular osseous tissue. True metaplasia in the eye.** Amer. Jour. Ophth., 1935, v. 18, May, pp. 409-419; also Trans. Amer. Ophth. Soc., 1934, v. 32, p. 294.

Mossa, G. **Anisocoria in relation to lesions of abdominal organs.** Boll. d'Ocul., 1934, v. 13, Oct. pp. 1402-1408.

Spontaneous or provoked anisocoria was found in 140 patients, fifty affected by chronic appendicitis, fifty by malarial splenomegaly, twenty by tumor of the liver, and twenty by unilateral chronic inflammatory processes of the female genital apparatus. The larger pupil corresponded to the diseased side. This finding may help in the localization of the general affection. (Bibliography.) M. Lombardo.

Pillat, A. **The occurrence of choroiditis in lupus erythematodes.** Graefe's Arch., 1935, v. 133, p. 566.

Among forty-eight cases of lupus erythematodes investigated, foci of choroiditis were found in sixteen. In fourteen these foci were old, in two some were old and some recent. In the majority only one eye was involved. The number of foci varied between one and five. As a rule, the foci were very peripheral. The clinical picture of these foci, positive results of different tuberculin reactions, the history of tuberculous disease in the family, enlarged lymphatic glands, eczematous keratitis, and positive x-ray findings in the lungs with a negative Wassermann led to the conclusion that the choroidal foci were tuberculous. H. D. Lamb.

Pritzker, L. **A rare case of sympathetic ophthalmia.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 231.

In a man of thirty-three years, with onset thirty years after injury, the diagnosis was confirmed histologically.
Ray K. Daily.

Puglisi-Duranti, G. **Mydriasis and absolute pupillary rigidity in two brothers with hereditary lues.** Arch. di Ottal., 1935, v. 42, Jan.-Feb., p. 1.

The brothers were nine and twelve years of age. Accommodation was in-

tact in both. The former had also a right facial paralysis, nystagmus, and optic atrophy. The latter had convergent strabismus and Hutchinsonian teeth. The author thinks a nuclear lesion the etiologic factor.

Herman D. Scarney.

Purtscher, Adolph. **On the formation of free cysts in the anterior chamber.** Zeit. f. Augenh., 1935, v. 86, April, p. 11.

In the eye of a ten-year-old boy, the author observed a free and translucent kidney-shaped cyst, 2 to 3 mm. in diameter, with masses of pigment on it. An irregular hole at the hilus suggested that there the cyst had been torn free from a pedicle which was visible at the pupillary margin, and which consisted of a pigment mass with translucent shreds at the free end.

F. Herbert Haessler.

Rieger, Herwigh. **Contribution to knowledge of rare malformations of the iris. 2. Hypoplasia of the anterior stromal layer of the iris with displacement and irregularity of the pupil.** Graefe's Arch., 1935, v. 133, p. 602.

The author reports the clinical findings in two unrelated young girls, ten and twenty-five years old. In all four eyes, a zone of opacity was observed in the region of the corneoscleral margin, the cornea was smaller than normal, persistent mesodermal tissue blocked the iris angle and lay upon the posterior surface of the cornea peripherally and upon the anterior surface of the iris, accompanied by strands of union between cornea and iris. The changes just mentioned constitute embryotoxon corneae posterius. There was also considerable hypoplasia of the anterior stromal layer of each iris. The pupil was displaced in one case downward and a little outward in the form of a wide oval slit in the right eye, and irregularly in a long wide slit in the left eye. In the second case the pupil of each eye was displaced inward and was oval. The lenses were not displaced but on their anterior surfaces small star cells represented a persistent pupillary membrane.

H. D. Lamb.

Safar, Karl. **An iris cyst in an aphakic eye healed by means of electrocoagulation.** Zeit. f. Augenh., 1935, v. 86, April, p. 31.

An iris cyst, increasing in size, was noted in an aphakic eye (cataract operation), associated with pain, inflammation, and loss of vision. Under local anesthesia an incision was made through the cornea and anterior cyst wall, so that the cyst was emptied, but not the anterior chamber. A spherical electrode was introduced and high frequency current (150 ma.) was applied.

F. Herbert Haessler.

Salmon, U. J. **A pupillary sign in ruptured ectopic pregnancy.** Amer. Jour. Obstet. and Gyn., 1934, v. 28, Aug., p. 241.

In four cases of ruptured ectopic pregnancy unilateral dilatation of the pupil was noted. A prominent symptom in all the cases was severe shoulder pain. The dilated pupil and the shoulder pain were not always on the same side. The dilatation of the pupil disappeared in all cases after operation. Three similar additional cases observed after this paper was submitted are mentioned at the close of the article.

Edna M. Reynolds.

Sédan, Jean. **Two cases of suppurative iridocyclitis of grippal origin.** Ann. d'Ocul., 1935, v. 172, May, pp. 375-379.

Two cases of severe iritis with hypopyon followed grippe. Both patients had previously had iritis, one rheumatic and the other luetic. Recovery followed the use of atropin and of milk injections. In one case culture of the aqueous showed the staphylococcus.

John C. Long.

Strampelli, B. **Ocular tuberculosis and lipolytic enzymes of the organism.** Boll. d'Ocul., 1934, v. 13, Nov., pp. 1425-1432.

In a case of serous iritis in a man of twenty-three years and a case of interstitial keratitis in a woman of twenty-four years, both of tuberculous origin, intramuscular injection of a lipolytic enzyme of liver led to rapid resolution of the local inflammatory process.

M. Lombardo.

Zolotizki, I. **Sympathetic ophthalmia.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 137.

Four cases are reported. The unusual feature of the first was an autumnal attack of uveitis recurring for seven years, and subsiding under therapy, with restoration of vision. The second case followed cataract extraction, ran a particularly severe course, and led to total blindness. The third case, based upon a perforating corneal ulcer, obtained 5/200 vision after enucleation of the exciting eye. A subsequent blow on the temple produced hyphemia with complete loss of the eye, which on pathologic examination showed a severe type of inflammation. The fourth case followed traumatic iridocyclitis and recovered 0.7 vision after enucleation of the injured eye. Ray K. Daily.

8. GLAUCOMA AND OCULAR TENSION

Filippov, H. **Cyclodialysis.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 51.

From a review of the literature and the results of fifty-four operations the author concludes that the operation is free from serious complications, including late infection and sympathetic ophthalmia, and is not disfiguring cosmetically; that it is effective before and after an Elliot trephining; that it is effective in deepening the anterior chamber as preliminary to a cataract extraction in a glaucomatous eye; that it gives a permanent result in secondary glaucoma; that permanent results may be obtained in sixty percent of cases after one operation and in eighty percent after a repetition; that it may be repeated any number of times, and the patient treated ambulatorily; and that it may be performed in cases with chronic conjunctivitis and diseases of the lacrimal passages. For these reasons it is preferable to fistulizing operations on an only eye, and in cases in which the fields are contracted to the fixation point. Ray K. Daily.

Galeazzi, C. **The action of an ester of cholin, carbaminoylcholin, in normal and pathologic eyes.** Boll. d'Ocul., 1934, v. 13, Nov., pp. 1443-1460.

Instillation of carbaminoylcholin in normal and pathologic human eyes gave a miotic and hypotonic effect, as illustrated in eight graphs. Particularly interesting are the results obtained in patients affected by simple chronic glaucoma. (Bibliography.)

M. Lombardo.

Kotlarevskaja, S. **Four years' results of Elliot's operation in the eye clinic of the Kharkov Medical Institute.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 58.

Tabulated reports of the immediate results of seventy-four operations, and of the late results of thirty-one operations, show the effect on tension satisfactory in compensated as well as in decompensated glaucoma, and vision improved in eighty-four percent of cases of compensated glaucoma and seventy-one percent of cases of decompensated glaucoma. Ray K. Daily.

Krilov, T. **Substitution of arecholin for pilocarpin and eserin.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 115.

From a study on the comparative effectiveness of these three miotics the conclusion is that arecholin occupies an intermediate place between eserin and pilocarpin, being ten times weaker than the former and six times stronger than the latter. On the pupil and accommodation it acts more rapidly than either, but its action is of shorter duration. It may be used in glaucoma in place of the other miotics. Ray K. Daily.

Marcus, I., and Youdkevich, D. **Glycemia in cataract and glaucoma.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 189. (See Section 9, Crystalline lens.)

Pokrovskii, A. **Zirm's operation for glaucoma, and Hay's anterior sclerotomy.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 35.

The operation consists of an external scleral incision at the limbus with a scalpel, plus iridectomy. It is superior to the usual iridectomy in that the external scleral incision permits complete excision of the root of the iris and sepa-

ration of anterior synechia in the region of the coloboma. This operation was used in thirty-one cases. Hay's scleral incision affords access to the angle of the anterior chamber without risk of injury to iris or lens in cases with very shallow or even absent anterior chamber. Ray K. Daily.

Russo, A. **The physiopathology of the sclerocorneal angle with special regard to the "pigmentary theory" of glaucoma.** Ann. di Ottal., 1935, v. 63, April, p. 305.

The case reported for study is that of a man twenty-four years old with profound alterations in the iris of each eye as a result of variola at the age of twelve years. The changes consisted of numerous circumscribed atrophic patches confluent and excavated in the iris stroma, with diffuse and atrophied trabeculae and pigment disintegration.

The left eye had chronic simple glaucoma. The author notes the normal depth of the anterior chamber during the entire period of glaucomatous development (which was finally relieved surgically) and explains the pathogenesis by obstruction of the sclerocorneal trabeculae with pigment detritus.

Park Lewis.

Rycroft, B. W. **The vascular control of intraocular pressure; some experimental observations.** Trans. Ophth. Soc. United Kingdom, 1934, v. 54, p. 315.

The author reports experimental work on the use of histamin in relation to increased intraocular pressure. He was unable to corroborate fully the findings which Friedenwald had published in 1932. He does conclude that ocular capillary pressure is the factor of greatest importance and that it is regulated by a local intrinsic nerve mechanism acting through the medium of a vasotoxic hormone, which may be histamin or some substance closely allied to it, such as acetylcholin.

Beulah Cushman.

9. CRYSTALLINE LENS

Denig, Rudolf. **My method of cataract operation.** Klin. M. f. Augenh., 1935, v. 94, April, p. 443.

Charging extracapsular extraction with from eight to ten percent of failures, connected with the operation for secondary cataract, Denig adopted the intracapsular operation, rendering it less hazardous by preparatory iridectomy, a small conjunctival bridge, and special technique for using the capsule forceps, all of which are discussed in detail. C. Zimmermann.

Guerrieri, G. **Laceration and removal of the anterior capsule in the cataract operation.** Boll. d'Ocul., 1934, v. 13, Nov., pp. 1505-1516.

The writer gives in tabular form the results of one hundred cataract operations, in fifty of which capsulectomy and in the other fifty capsulotomy was performed. Visual acuity was better in the first group, both early and late after the operation, and the gain was in proportion to the amount of capsule removed. In capsulotomy cases the visual acuity was better in cases in which a piece of capsule was freed by the cystotome and was extracted with the lens. The percentage of secondary cataract was higher in capsulotomy cases. (Bibliography, two photomicrographs.)

M. Lombardo.

Hambresin, L., and Van de Maele, M. **The syndrome of Marfan. New conceptions on the subject of its pathogenesis.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 70.

This is a report of two families affected by the disease. In one the mother and three out of seven children had the typical form. In the other the mother and one of two children were affected by an arrested or incomplete form. Luxation of the crystalline lens exists from an early age and has a tendency to increase. The ocular refraction is modified by relaxation of the zonule and displacement of the lens. Marfan's syndrome results from embryonic alteration of the anterior hypophysis, due to various causes, especially toxic and microbic. Although the pituitary gland and the sella turcica are below normal size the prehypophysis secretes an excess of growth hormone by increase in number of eosinophile cells or by their

greater activity. This hormone acts on the cells of the anterior horns of the spinal cord, which nourish bones and muscles. It first provokes hyperfunction and later hypofunction (scoliosis). The deformity of the fingers may be explained by the same mechanism. While the hypophysis of the embryo undergoes dystrophy, the lens and zonule, also of ectodermic origin, may undergo a change which leads to displacement of the lens. (Thirty-two illustrations.) J. B. Thomas.

Marcus, I., and Youdkevich, D. **Glycemia in cataract and glaucoma.** Sovietskii Viestnik Opht., 1935, v. 6. pt. 2, p. 189.

The author considers 0.06 to 0.08 percent of blood sugar as normal; 0.08 to 0.110 as relative, and above 0.110 as absolute hyperglycemia. Forty-nine cataract cases were examined for the blood-sugar content. According to the above standard 16 percent of the cases had absolute and 34.7 percent relative hyperglycemia. The hyperglycemia was higher in patients over fifty years and in patients with mature cataract. The author attributes the hyperglycemia to senile endocrine changes. Of thirty-nine glaucoma patients 13 percent had an absolute and 30 percent a relative hyperglycemia. The blood sugar was higher in cases of chronic, absolute, and juvenile glaucoma. Ray K. Daily.

Palmieri, L. **The action of ultraviolet rays on the oxidation of some organic acids by the crystalline lens.** Boll. d'Ocul., 1934, v. 13, Nov., pp. 1482-1491.

By irradiating one eye of each of several rabbits with ultraviolet rays for three consecutive days, keeping the other eye for control, the author found that the crystalline lens accelerated discoloration of methylene blue in the presence of potassium fumarate and maleinate. He assumes that ultraviolet rays determine changes in the atomic groups of the cells of the irradiated tissue, and that elimination of the atoms that are fixated by these salts forms a new base which assists in reduction of the methylene blue. (Bibliography.) M. Lombardo.

Popov, M. **One hundred cases of intracapsular cataract extraction.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 76.

The technique used is as follows; anesthesia with three percent cocaine; dilation of the pupil with scopolamin; akinesis after Van Lint; section with a conjunctival flap; grasping of the conjunctival flap with forceps and pulling down of the upper portion of the cornea exposing upper portion of anterior chamber; introduction of a spatula into the anterior chamber and breaking of the suspensary ligament by moving the lens up and down and from side to side; iridectomy; expression of the lens by pressure from above and below. The results are tabulated and the author concludes that the merit of the intracapsular extraction consists in its applicability to the extraction of immature cataracts, which lend themselves particularly well to this type of extraction. Its defect is the more frequent loss of vitreous, due in part to conditions of the vitreous which cannot be determined before the operation. Ray K. Daily.

Posthumus, R. G. **A case of lenticonus posterior.** Nederlandsch Tijdschr. v. Geneesk., 1935, April 13.

The author argues that the slight degree of cataract generally present, with incidental peculiarities of refraction, may be explained by disturbance of normal conditions of growth at the posterior pole. E. E. Blaauw.

Romanova-Bochon, O. **The rôle of the parathyroid in the pathogenesis of cataract in the young.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 67.

Safar, Karl. **An iris cyst in an aphakic eye healed by means of electrocoagulation.** Zeit. f. Augenh., 1935, v. 86, April, p. 31. (See Section 7, Uveal tract, sympathetic disease, and aqueous humor.)

Von der Heydt, Robert. **The aging lens.** Amer. Jour. Ophth., 1935, v. 18, June, pp. 545-546.

Weekers, L., and Dumont, P. **Calcification of cataracts revealed by radiography.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 17.

The crystalline lens may become calcified especially in cataracts that follow as a complication of some ocular disease. In such cases an operation for cataract presents risks and it would be useful to know of such degeneration of the lens in order to regulate one's technique. The usual clinical examination, including biomicroscopy, furnishes instructive information concerning the anterior surface of the lens, but radiography yields precise findings concerning calcification with form and volume of the lens. J. B. Thomas.

Wolfe, O. **Summary of one hundred Barraquer cataract extractions.** Amer. Jour. Ophth., 1935, v. 18, June, p. 556.

Yazujian, D. M. **A new after cataract technique.** Amer. Jour. Ophth., 1935, v. 18, June, p. 556.

10. RETINA AND VITREOUS

Barg, Z. **Malarial vascular lesions of the retina.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 100.

The fundus complications of four patients with severe tropical malaria consisted principally in large subhyaloid hemorrhages in the region of the optic disc and the macula.

Ray K. Daily.

Barrada, M. A. **A few hints on operations for detachment of the retina.** Bull. Ophth. Soc. of Egypt, 1934, v. 27, p. 22.

Localization of retinal tears by means of the Gullstrand ophthalmoscope is described, and brief summaries of Safar's microcoagulation, Weve's microcoagulation, Larsson's transcleral diathermy, and Lindner's undermining and scleral-shortening operations are given. The pyrometric electrode of Coppez is mentioned as a means of preventing necrosis of the sclera in transcleral coagulation. The necessity of wearing stenopaic spectatcles after operation for detachment of the retina is emphasized.

Edna M. Reynolds.

Belousova, P. **Malarial retinal hemorrhages.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 104.

On the basis of findings in twenty-three malaria patients the writer concludes that retinal hemorrhages may occur in all types of malaria; that they are usually situated in the preretinal layers and most frequently involve the macula; that they are absorbed and the prognosis for vision is good; that they occur in inadequately treated cases; and that they are closely associated with malarial anemia.

Ray K. Daily.

Coppez, Leon. **Improvements in the pyrometric electrode.** Bull. Soc. Belge d'Opht., 1934. no. 69, p. 119.

The author mentions a slight change in his apparatus (see numerous previous references).

Espildora Luque, C. **Ophthalmoscopy of arterial hypertension.** Ann. d'Ocul. 1935, v. 172, May, pp. 353-375.

The author classifies the various hypertensive conditions as follows: (1) acute generalized hypertension (as in eclampsia and acute glomerulonephritis), with marked contraction of the retinal arteries and veins and slight retinal edema, but no evidence of sclerotic changes in the vessels; (2) primary hypertension (essential) with extreme tortuosity of the small retinal veins, especially near the macula; (3) hypertension secondary to toxins (as in chronic glomerulonephritis and nephrosclerosis) with both arteries and veins constricted and filiform, striking changes at the arteriovenous crossings and often neuroretinitis with exudates.

John C. Long.

Fahmy, A. Y. **Modification of an old precedure for treatment of totally detached retinae.** Bull. Ophth. Soc. of Egypt, 1934, v. 27, p. 33.

A method of resection of the sclera combined with cauterization of the underlying choroid with potassium hydroxide and evacuation of the subretinal fluid is described by the author. He aims not only to close the tear and

drain the subretinal fluid but also to obliterate the pouches between vitreous and retina where fluid collects, and by preventing further contraction of the vitreous to relieve the retinal tissues from the pull to which the vitreous subjects them. Three cases operated on by the author's method are reported. Two were entirely satisfactory and one partially so. Edna M. Reynolds.

François, J. **Vascular anomalies of the retina and venous anastomoses on the papilla in a patient with glaucoma.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 97.

This case report includes three illustrations and twenty references.

Fritz, A. **Unilateral change in pressure of retinal vessels.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 103.

The pressures in the retinal vessels are not exactly equal as between the two eyes. The minimum in the artery of the left eye exceeds by 10 mm. Hg the minimum in the right eye, and the maximum is generally more elevated in the left than in the right. The venous pressure differs in lesser degree. These differences are doubtless due to lack of symmetry between the carotids. The greater frequency of thrombosis of the retinal vein on the right side seems to depend on the frequency of a slight hypotension on that side. The severity of senile macular chorioretinitis is increased on the side with relative hypotension; that of retinal hemorrhage on the side of the relative hypertension.

J. B. Thomas.

Halbertsma, K. T. A. **So-called coloboma of the macula lutea.** Nederlandsch Tijdschr. v. Geneesk., 1935, March 23.

Observations on five cases of macular coloboma, three unilateral and two bilateral, are reported. Other ocular anomalies, mostly mesodermal, were found in the patients and their relatives. No old inflammatory signs were encountered. In each unilateral case the other eye had slightly impaired function (enlarged blind spot, central color vision abnormal). In each bilateral case one eye had the better visual acuity and field of vision. Red-free light showed retinal fibers extending over the whole coloboma; bloodvessels visible in the bottom of the gap, and having irregular appearance and course; and in some cases communication with retinal vessels outside the coloboma. The defect results from faulty mesodermal development. (Colored illustration.) E. E. Blaauw.

Klar, J. **An ocular syndrome after commotio cerebri.** Klin. M. f. Augenh., 1935, v. 94, April, p. 500.

Twenty patients with commotio cerebri complained of constant headache, vertigo, flickering, and visual obscuration. They had normal objective neurological and ophthalmoscopic findings. Bailliart's ophthalmodynamometer showed pathologic hypertension of the retinal arteries, and the campimeter visual fields. The hypertony was considered as due to traumatic irritation of the vasomotor center in the medulla oblongata. The contraction of the visual field is attributed to hypertonic disturbances of circulation leading to lack of oxygen in the retina.

C. Zimmermann.

Koyanagi, Y. **The etiology and genesis of idiopathic detachment of the retina in sympathetic ophthalmia.** Graefe's Arch., 1935, v. 133, p. 559.

Study of retinal detachment in two cases of sympathetic ophthalmia convinced the author that the detachment was due to primary secretion of a highly albuminous fluid by the retinal pigmented epithelium, just as in exudative and nephritic retinitis.

H. D. Lamb.

Langdon, H. M. **Partial detachment of the retina treated successfully with Shahan's thermophore.** Amer. Jour. Ophth., 1935, v. 18, June, pp. 550-551.

Löwenstein, Arnold. **Sympathectomy (Leriche-Doppler) at the carotid in the treatment of atrophic processes in the retina and optic nerve.** Graefe's Arch., 1935, v. 133, p. 636.

To produce hyperemia in the eye bilateral sympathectomy was performed in seventeen cases of retinal degeneration, choroiditis and optic atrophy. In most cases vision and fields of vision were a little improved after this procedure but the increase was not progressive. The operation caused no damage, was easily tolerated, and in young individuals could be performed on both sides at the one time. Changes belonging to Horner's syndrome were either absent or mild. H. D. Lamb.

Löwenstein, Arnold. **Treatment of detachment of the retina.** Klin. M. f. Augenh., 1935, v. 94, April, p. 491.

Two cases did not present a retinal tear, but were cured by diathermy according to Weve-Safar, showing that closure of a tear cannot exclusively be made responsible for reattachment. After three divisions of retinovitreal bands according to Deutschmann, the second case taught further that even with persistence of the detachment for eleven years with rarefaction and hole formation complete reattachment is possible. For localization Löwenstein marks two points with the diathermic needle to produce a line for orientation, after indicating the meridian of the tear with India ink at the limbus.

C. Zimmermann.

Manen, J. G. Van. **A periscope as aid in diascleral transillumination for retinal localization.** Klin. M. f. Augenh., 1935, v. 94, April, p. 497. (Ill.)

The periscope consists of a glass cylinder 5 mm. thick and 50 mm. long. The upper circular surface is plane, the lower is ground off at an angle of forty-five degrees and with silvering acts as a mirror. The side opposite the mirror is ground plane. With this exception and the upper circular surface the glass cylinder is painted black. The lateral plane surface is pressed to the sclera, so that an India ink dot which has previously been marked on the sclera at examination with the localization ophthalmoscope lies about in its center. While the operator uses the ophthalmoscope the assistant looks through the upper surface of the periscope to see whether the ophthalmoscopic light spot coincides with the India ink dot. If not, their distance from each other can be observed and marked. C. Zimmermann.

Meyer, K., and Palmer, W. **The polysaccharide of the vitreous humor.** Jour. Biol. Chem., 1934, v. 107, Dec., p. 629.

The authors obtained a polysaccharide acid of high molecular weight from cattle vitreous. The acid has an apparent equivalent weight of about 450. A uronic acid, an amino sugar, and possibly a pentose have been recognized as constituents. It is suggested that there is a relationship between the acid and the pathogenesis of glaucoma.

M. E. Marcove.

Roggenkämper, W. **Hole in the external layers of the detached retina.** Klin. M. f. Augenh., 1935, v. 94, April, p. 456.

In a woman of sixty years splitting of the retina into two layers, due to vascular degeneration, apparently caused rupture of the external layer while the inner layer next the vitreous remained intact. The basis of this conception was the existence of a dense venous net over the hole, for such venous branches occur only in the nerve-fiber layer.

C. Zimmermann.

NEWS ITEMS

Edited by Dr. H. Rommel Hildreth
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News items should be sent to the Editor by the twelfth of the month.

Deaths

Dr. Jules Gonin, Lausanne, Switzerland, aged 65 years, died, June 10, of cerebral hemorrhage.

Dr. Henry Edwards Oesterling, Winter Park, Florida, aged 62 years, died, May 22.

Miscellaneous

Prof. Henry Mitchell Smith, the present incumbent of the Chair of Ophthalmology at the Long Island College of Medicine, is about to become emeritus professor. Dr. Smith has, for many years, endeared himself to the thousands of students passing through the College; has stood for the finest and best in ophthalmology, and has earned the respect and admiration of all who know him. He has developed his department from an almost negligible beginning to its present high state of modern efficiency. The College draws material from the Borough of Brooklyn, the population of which (2,560,000) is larger than each of thirty-one states. It is partly through the efforts of Professor Smith that the College has been able to maintain its Grade-A rating. All of Brooklyn wishes to pay deference at this time to a man who has been so big a factor in elevating the standards of ophthalmology.

Societies

The Latin American Congress of Physical Therapy, X ray, and Radium will hold its first annual meeting in Mexico City from August 29 to September 5, according to an announcement by Dr. Cassius Lopez de Victoria, executive director of the organization. The National University of Mexico will act as host to their North American colleagues, and the government will participate in extending hospitality to the delegates.

The Pacific Coast Oto-Ophthalmological Society will hold its next meeting in the spring of 1936 at Del Monte, Californa. The officers elected for next year are as follows: president, Dr. H. G. Merrill, San Diego; first vice-president, Dr. F. G. Sprowl, Spokane; second vice-president, Dr. Harold A. Fletcher, San Francisco; secretary-treasurer, Dr. Frederick C. Cordes, San Francisco.

Personals

Dr. William H. Wilmer has been elected to the Board of Regents of Georgetown University. Also, he was recently elected President of the American Horticultural Society.

Prof. E. Engelking of Cologne, formerly an assistant to Prof. Theodor Axenfeld at Freiburg, has been appointed to succeed Professor Wagenmann (retired) at Heidelberg.